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ABSTRACT

Seven articles are presented addressing topics related to United States-Japan trade, foreign investment, and U.S. competitiveness in the global market. The first article, "Super 301 and the Changing Japan-American Relationship" by Glenn Davis describes recent U.S.-Japan trade frictions, epitomized by Super 301, and explains the influence of the economy, politics, national security, and technological issues related to the current trade crisis. Stephen Magee in his article, "The Decade Effect: The Stock Market Malaise of the 1990s," compares two opposing predictions for the stock market. In "Zero Defect Manufacturing," Hirofumi Matsuo outlines the efforts managers need to make to produce high quality products and emphasizes that company-wide and coordinated activities are indispensable to survive in the competitive market. "What are 'Sogo Shosha' and Their Function in today's U.S.-Japan Trade Relations?" by Yasutomo Katsuno discusses how sogo-shosha, Japanese trading companies, contribute to the resolution of frictions. The article by Jim George, "High Technology Competition between U.S. and Japanese Companies," explains why it is important for the United States and Japan to remain friends. Mio Reynolds in "Foreign Direct Investment in the United States" examines public opinion concerning foreign investments. The final article by Elsie Echeverri-Carroll, "The Future of the Maquila Industry in Mexico," describes the historical changes in the maquila industry and various factors that will affect the industry in the future. (KM)

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The Japan Business Study Program

TRADE, FOREIGN INVESTMENT, AND COMPETITIVENESS

Edited by
Hirofumi Matsuo

The University of Texas at Austin
Graduate School of Business
Bureau of Business Research
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Foreword

The Japan Business Study Program is the product of a unique and important partnership between the Graduate School of Business and the Japan External Trade Organization (JETRO). The goal of this partnership is to allow MBA students and U.S. business executives to increase their understanding of Japanese business practices and concepts and to promote interaction between the business communities of Japan and the United States, particularly as they are represented in Texas.

Mr. Yutaka Nakata, Executive Director of JETRO, and I are very pleased with the success of the initial efforts of our partnership, and we look forward to the success of our joint endeavor. We dedicate *The Japan Business Study Program: Trade, Foreign Investment, and Competitiveness* to the distinguished speakers, students, and executives whose efforts made the seminars of the Japan Business Study Program possible.

Robert E. Witt
Dean, Graduate School of Business

Preface

This volume is based on a seminar series entitled "Japan Business Study Program, 1989," held at the Graduate School of Business, the University of Texas at Austin, October 12-27, 1989. This seminar series was organized by the Japan External Trade Organization (JETRO) and the Graduate School of Business and cosponsored by the IC^2 Institute, the Austin Chamber of Commerce, the Japan American Society of Austin, and the Texas Department of Commerce. Building on the knowledge and understanding developed in the 1988 program, which was recorded in *The Japan Business Study Program: Understanding Japanese Business*, the 1989 seminar series explored the issues related to U.S.-Japan trade, foreign investments, and U.S. competitiveness in the global market.

The seminar began with Yutaka Nakata, Chief Executive Director of JETRO, Houston, providing an overview of the general background knowledge on U.S.-Japan relations, including their history, geography, and trade and investment statistics. By taking full advantage of the audio-visual effects made possible by multimedia presentation devices, Dr. Seiji Iwata, Director of the Institute of Behavioral Sciences, Japan, discussed the changes occurring in Japan. He also presented his views on effective management.*

Glenn Davis, longtime resident of Japan and American correspondent for *Days Japan*, opened the second session. He described recent U.S.-Japan trade frictions, epitomized by Super 301, and explained the influence of economy, politics, national security, and technology issues on the current trade crisis. The recent political instability in Japan and its effects were also assessed.

In that same session, Stephen P. Magee, Professor of Finance at the University of Texas at Austin, compared two opposing predictions for the stock market in the 1990s. The optimistic forecast is based on the prospective increase in the U.S. savings rate, the reduction of stock supply, and the Japanese investment in U.S. stock. The pessimistic view recalls the recent expansive fiscal policy, the potential readjustment of the Japanese stock market, and the rising protectionism in trade policies. Dr. Magee emphasized the necessity of a sound U.S. and Japan trade relationship.

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* The contributions of Mr. Nakata and Dr. Iwata are not available in this volume.

In the third session, we shifted our attention to manufacturing issues. The competitiveness of the U.S. manufacturing sectors has come to be recognized as one of the basic issues affecting the trade imbalance. I outlined the management techniques used by Japanese manufacturers to achieve extremely high quality. The topics covered included company-wide quality control, design for manufacturability, and process flow rationalization.

In the fourth session, Yasutomo Katsuno, Senior Vice President and General Manager, Sumitomo Corporation of America, Houston office, reviewed U.S.-Japan trade relations. Putting the characteristics of Japanese society, particularly its homogeneity, into a historical perspective, Mr. Katsuno discussed the Japanese *sogo-shosha* (general trading company) and its potential role in resolving trade issues.

Following this discussion, Jim George, Corporate Vice President and General Manager, MOS Memory Products Division, Motorola, summarized the strategies, tactics, and cultures of Japanese manufacturing corporations. He presented very important and alarming statistics illustrating the rapid expansion of the Japanese semiconductor industry and the erosion of U.S. competitiveness, and he outlined the measures that U.S. industries and government will have to take in order to stay competitive in the world market.

During the last day of meetings, Mio K. Reynolds, President of Reynolds Research, Washington D.C., shared her experience and information concerning foreign investments in the United States. She presented the results of public opinion polls and various statistics on foreign investments in the United States and U.S. investments abroad. After an examination of pertinent legislative activities, her talk concluded with a case study of foreign investments in the U.S. steel industry.

The seminar ended with Elsie Echeverri-Carroll's presentation on the future of the maquiladora industry. An economist with the Bureau of Business Research, Dr. Echeverri-Carroll presented part of the results of the Bureau's ongoing research project on investments, both American and Japanese, in maquilas. After describing the historical changes in the maquiladora industry, she listed the various factors that will affect its future.

Overall, the seminar series covered various issues related to U.S.-Japan trade, providing revealing statistics, new information,

and a variety of suggestions and recommendations. I hope that this volume will give the reader both an accurate picture of U.S.-Japan relations and a better understanding of the complex issues that define that relationship.

Hirofumi Matsuo
Associate Professor, Graduate School of Business

Acknowledgments

Many individuals and organizations helped make this book possible.

First, we wish to thank each author who contributed to this volume and all the seminar participants.

We are also very grateful to the Japan External Trade Organization (JETRO) and to the Graduate School of Business. Each provided important resources and support for the seminar series from which this book was developed. We appreciate the contributions of the supporting organizations: the IC^2 Institute at the University of Texas at Austin, the Austin Chamber of Commerce, Japan American Society of Austin, and the Texas Department of Commerce.

Yutaka Nakata, Chief Executive Director of JETRO, Houston, provided the leadership and active support that made this seminar series possible for two successive years. His dedication to and enthusiasm for achieving a harmonious world are everlasting. We wish to express our appreciation to Shintaro Oish and Hisashi Yamada, both of JETRO, Houston, and to Dean Robert E. Witt and Associate Dean Robert S. Sullivan of the Graduate School of Business at the University of Texas at Austin.

Special thanks go to Susan N. Brown, Claudia L. Woody, and Christy V. Bataille, the Graduate School of Business, for their help in administering and organizing the seminar series, and to Deanna Johnson, the Graduate School of Business and Bureau of Business Research, for her help in the production of this volume. We wish to thank Lois G. Shrout and Sally Furgeson, Bureau of Business Research, for their extensive editorial assistance.

Super 301 and the Changing Japan-America Relationship

by Glenn Davis

Geopolitical Realities

I sincerely believe that the United States and Japan are headed for a trade war if some basic bilateral faults are not corrected. The Japanese challenge is not coming--it's already here, and the United States must develop a better response than simply clinging to an outmoded trade policy introduced 40 years ago.

We can start by throwing the free trade argument in the historical garbage heap, where it belongs. In 1960 trade accounted for only 10 percent of the U.S. GNP, but that figure had doubled by the mid-1980s. Japan and the United States together account for 37 percent of the world's GNP, but the General Agreement on Tariffs and Trade (GATT) now covers only 7 percent of international trade flows. Today some 75 percent of world commerce is conducted by economic systems operating with principles at odds with those of the United States, as Pat Choate and Juyne Linger pointed out earlier this year in the *Harvard Business Review*. If the United States naively expects the rest of the world to play by its outmoded rules, then it is headed for economic disaster. It is time that Americans woke up and developed a more realistic approach to world trade, a scenario in which we can win instead of consistently losing. Perhaps finally the "let's get tough with the Japanese" stance now coming from Washington may be more than empty political rhetoric.

One of the main reasons that the United States got into the current predicament is its traditional fear of communism, its red and white view of the rest of the world. From the U.S. point of view, its postwar relationship with Japan has been based firmly on a military agreement, the U.S.-Japan Security Treaty, and economic issues have taken on secondary importance. This is exactly opposite the order in which the Japanese have often ranked priorities. To American military strategists, the bilateral relationship had more to do with Japan's strategic position in northeast Asia vis-à-vis the communist powers of the Soviet Union, the People's Republic of China, and North Korea than it did with the economic reconstruction of the Japanese economy. However, Japan's rise to economic superpower status, *perestroika* in the Soviet Union, the political warming of relations between the USSR and the People's Republic of China, and the isolation of North Korea's fanaticism from mainstream Asian communism have all led to an undermining of the Pentagon and Defense Department's emphasis on maintaining Japan as a military partner to stave off "Soviet adventurism" in the Pacific. Japan's key role as "bastion of anticommunism in Asia" now seems conspicuously and dangerously out of place in relation to Gorbachev's "new" Soviet Union.

Meanwhile, the less affluent and post-Vietnam American public has tired of supporting this "bastion" while its more affluent denizens grow richer and richer. Tempers flare when talk switches to bilateral business dealings. Some 60 percent of Americans consider Japan unfair in its business dealings with the United States according to a recent poll by the American Insight Group of Cambridge, Massachusetts. Another national

survey of Americans in January 1989 showed that a startling 63 percent now consider Japan's economic might a greater threat to the security of the United States than the military forces of the Soviet Union, with half that percentage answering a firm "yes" to this survey question. Cold war terms have even been shifted to Japan as evidenced by the recent *Atlantic Monthly* article by James Fallows entitled "Containing Japan."

It is not difficult to understand the pique of Americans since the United States has a $55.4 billion trade deficit with Japan, accounting for 40 percent of the entire worldwide U.S. trade deficit in 1988, and it is still growing. Nipponphobia is real. "Nearly half the national debt is already owed to foreign lenders. Suppose they tire of financing our annual deficits or refinancing our national bonds?" asked a recent *Hartford Courant* article. The Japanese may scoff at such fears as being irrational, but Americans find cause for genuine alarm. Complacent Americans are in danger of encountering a dropping standard of living and their country being classified a "bad risk" by foreign investors. Yet most remain unconvinced of the rough days ahead.

Turf Wars Within the U.S. Government

Reflections of the tougher American attitude toward Japan have started to appear in government, creating a split between the positions of the State Department/Defense Department/Pentagon on the one hand and the Commerce Department and a rapidly growing number of hostile senators on the other. The former considers security issues of greater importance than trade while the latter feels that a new trade policy should be established in which the United States deals with Japan in a much tougher manner. The common element linking these two divergent viewpoints, however, is that trade and defense have become intertwined. Instead of politely asking, the United States is now demanding that Japan contribute more to its own defense while offering greater support from the system of international trade that Japan has adeptly used to enrich itself in the postwar period.

In a wider sense, "techno-nationalism" has begun to appear in both the United States and Japan, two countries that happen to be military allies but rivals in trade, especially in the field of high technology. There is no clear consensus on the meaning of the term techno-nationalism, but most scholars point to recent switches in national policies in the United States and Japan concerning technology transfer--particularly in high tech--and the tightening of governmental controls on such moves. As Professor Nathaniel B. Thayer of Johns Hopkins University points out, there seem to be two new signals emanating from Washington: firstly that the United States now feels that Japan's defense is subordinate to the trade problem and secondly that Japan should no longer expect access to the United States' most advanced technology, even for its own defense. On the Japanese side, a growing number of right-wing hawks are advocating greater autonomy from Washington's wishes, specifically that Japan scrap such deals as the FSX and return to the country's original plan of building a fighter without American (but not without European) help. As the *Nihon Keizai* put it: "Behind Japan's unwavering stance in the bargaining is the outcry within its defense industry over what is viewed as a potential threat of an American invasion of the home market."

Conversely, many observers in the United States and Asia fear that the Japanese will move into military production once they suffer heavy competition in their traditional fortes, producing automobiles, consumer electronics, and other commodities. A "private memo"

circulating in Tokyo claims that by the end of the 1990s Japan could control 45 percent of the world's tank and motorized artillery market, 40 percent of the free world market in military electronics, 30 percent of the high tech dependent aerospace sector, and perhaps 60 percent of all world naval construction outside the Soviet bloc. Revelations like these make neighboring countries in Asia extremely nervous about Japanese rearmament, particularly inasmuch as Japan already maintains one of the world's largest and best equipped armies. It is already the third largest military spender in the world, with a defense budget that exceeds that of any of our NATO allies and is bigger than the combined defense outlays of the members of the Association of Southeast Asian Nations (ASEAN).

Super 301 at Work

President George Bush, deciding to fire a warning shot rather than start a full-fledged trade war, unveiled the Super 301 section of the 1988 Omnibus Trade and Competitiveness Act. Super 301 gives the president the discretion to retaliate against nations with unfair trading practices if they are not corrected within 12 to 18 months. U.S. Trade Representative Carla Hills ruffled even more feathers in Tokyo earlier this year by singling out Japan, along with Brazil and India, as being "unfair traders." The Japanese initially responded with a hotheaded denunciation of Super 301, saying they would not negotiate under a threat of retaliation and issuing their own threat to take the case before GATT. But there is no denying that Super 301 got their undivided attention. The Japanese quickly responded by setting up the "Structural Impediment Initiative" (SII) in September, a series of talks designed to eliminate or streamline structural trade barriers, such as Japan's complex distribution system.

These bold new moves in Washington brought out the worst in both the Japan bashers and the Japan apologists, or the hawks and the Chrysanthemum Club as *Newsweek* recently called those groups with opposing views on Japan. The former were delighted by Carla Hills's references to opening Japan "with a crowbar," but the latter cried foul, that we were indeed breaking GATT rules. About the same time, Dutch journalist Karel Van Wolferen came out with a book, *The Enigma of Japanese Power: People and Politics in a Stateless Nation*, that argued that Japan could not change, even if it wanted to. In other words, Japan needed a shove, for its own good, as the *New York Times* put it.

Meanwhile, the European Economic Community is busy preparing its 1992 project as a lever to force open foreign markets to its products, much like the mechanism of Super 301. It seems very odd to me that Japan and other countries are strangely quiet about that movement but vehemently denounce Super 301 as "protectionist." Maybe we should have rolled out this bargaining tool long before Japan and other Asian countries began building up huge trade surpluses with the United States. It is true, as the *Wall Street Journal* aptly pointed out, that the United States is the only country among the developed nations that remains ambivalent about the use of government to advance its commercial interests. It was decades ago when Japan first set up its Ministry of International Trade and Industry (MITI) to fuse the interests of the public and private sectors. How can the United States expect to win in international trade by agreeing to play against such a stacked deck?

The New Hawks

Probably more ominous than distressing for the Japanese is the appearance of a new breed of American hawks who recently rallied

around the Super 301 banner in the FSX dispute. Sometimes referred to as the "trade warriors," they are led by Clyde V. Prestowitz, Jr., a former Tokyo businessman and Commerce Department official from 1981 to 1986, who later published a much discussed book entitled *Trading Places: How America Allowed Japan to Take the Lead.* Mr. Prestowitz, who was involved in some of the toughest negotiations with Japan including rice, beef, and computer chips, vociferously spoke out against the FSX deal and called on the United States to get tougher with Japan. Clyde became worried after observing the way in which the Japanese shield industries from outside competition, support their R&D, and then unleash those industries as powers on the world market.

Prestowitz sees the State Department as the biggest impediment to developing a policy that would allow U.S. companies to compete more effectively with their Japanese counterparts. This leading opponent of the FSX deal thinks the Japanese are more like the early American settlers than modern Americans are, circling their wagons when under attack and basically taking on all comers. The Japanese mainly win in international competition with American companies, Prestowitz claims, because of "the emphasis that Japan puts on industrial planning and trade protectionism to improve its national security." Free market principles are no match for industrial targeting, and Prestowitz realizes this weakness is built into the American sense of justice and fair play.

But no one in the United States is seriously considering pushing Japan to the point where it would choose other business partners. Japan's own hawks on international trade should consider what a shift in trading patterns would do to their country's international political position. The ruling Liberal Democratic Party's Motoo Shiina recommends that Japan and the United States complement each other in military technology because he fears that "techno-nationalism would isolate Japan internationally."

Journalist Kathleen Kouril seemed to hit this particular nail squarely on the head when she recently wrote: "American-Japanese trade friction could take on a new meaning if both sides are trying to export to an expanding Soviet market." New markets are indeed hard to find, but how would the Soviets react? One Japanese politician offered a curious possibility: "I wonder if Japan's high-tech advancement might invite a situation in which the United States and the Soviet Union might try to encircle Japan," said Naoto Kan, a member of the United Social Democratic Party. Although the overvalued ruble and laws restraining international remittances currently put the damper on joint venture formation, such Japanese companies as Mitsui, Seibu Saison, and Shimizu Corporation have already announced a whole line of investments in the Soviet Union, including a 12 billion yen high-rise hotel project in Moscow.

But no country can contemplate going it alone in today's interdependence of nations. There can be little doubt that the infrastructure between Japan and the United States is becoming quite intertwined, as David I. Hitchcock recently pointed out in the *Los Angeles Times*, noting that:

* The two-way trade amounts to $112 billion.

* Japan is our largest market outside North America, buying 20 percent of all U.S. agricultural exports and 15 percent of all U.S. aircraft.

* 60,000 Americans in uniform live on bases in Japan, which pays about 40 percent of the annual expenditures of $6.2 billion, more than any other host ally pays.

* Japan remains a close ally, deploying more tactical aircraft than the United States has in Asia and twice as many destroyers as in the U.S. Pacific Fleet.

* Japan can claim over $25 billion of direct investment in the United States, creating close to 200,000 jobs, and overall investments that equal about one-third of the U.S. national deficit.

* More generally, the United States enjoys rapidly expanding cultural ties with Japan: 195 U.S. cities have sister ties in Japan; 39 states now have offices there; 800,000 Americans visit Japan annually and over two million Japanese tour the United States; Japanese students in U.S. universities number 20,000 and about 1,800 Americans study in Japan; Japanese is now taught in 210 American high schools to 10,000 students, and that number is rapidly rising.

A Weakened Japan

But before we go envisioning Japan as number one, as Harvard professor Ezra Vogel did in *Japan As Number One: Lessons for America*, let's consider a nation greatly weakened by a string of scandals and unpopular tax increases that have undermined the alliance between big business and the ruling Party (LDP) and have caused that same party to suffer a humiliating defeat in the last national election. The LDP's crucial farm vote has been estranged by liberalizations in the nation's agricultural imports. Japan had three prime ministers in 1989 and the third is standing on very shaky ground. The Recruit scandal continued longer than most, inflicting economic damage on the bilateral relationship by undermining the value of the yen on international markets and causing the dollar to rise at the very time the U.S. government had counted on its falling further. This turn of events has also placed a negative spotlight on Japan's leadership just when the world is expecting a new leadership role for the country.

Looking deeper, however, one can see that whoever Japan's prime minister happens to be, policies affecting the bilateral relationship will change little, if at all. I believe that the military alliance between the two countries will remain intact even if, as some observers think, Mrs. Takako Doi, leader of the Japan Socialist Party, becomes Japan's first female premier in the next House of Councillors election. But no matter, the Japanese will have to adjust to the tough new attitude toward trade that is emerging in Washington, which now places a great deal more emphasis on commerce than defense.

Bilateral bickering tends to become intense in national level politics, but a two-way infrastructure on the regional level may serve as a safety net for these political acrobatics. A recent report issued by the Japan Center for International Exchange (JCIE) of Tokyo points out that politicians on both sides of the Pacific face a dilemma in trying to reconcile national and local interests. Only an increased understanding at the local level will provide a firmer political and cultural basis for national foreign policies and that will facilitate a smoother resolution of international conflicts. Greater human interaction between the two societies will provide a stronger and broader basis for a mutually beneficial cooperative relationship. Let's hope that JCIE is right and that an all-out trade war can be avoided. In such a conflict, there are no winners. And in this case, the whole world would be the loser.

Glenn Davis is the U.S. correspondent for Days Japan, *a Japanese language magazine published by Kodansha, Japan's largest publishing company. A Texas native who speaks Japanese fluently, Davis lived in Japan for 20 years. He has worked in journalism in*

Japan for 15 years, serving as editor-in-chief at Tokyo Journal *and as Tokyo correspondent for* Business International. *He also works as a consultant on Japan in the field of international public relations. Davis holds undergraduate and graduate degrees from Sophia University in Tokyo.*

The Decade Effect: The Stock Market Malaise of the 1990s

by Stephen P. Magee

Everyone is an expert on the stock market because it has a high noise to signal ratio. On any given day, anything can happen, and usually does. This makes it hard to know whether one theory about the market is better than another. Before examining the decade effect, consider some popular and academic theories about the stock market.

For the last twenty years, the most widely circulated academic theory about the stock market has been the "efficient market theory." The theory is simple: to know what the stock market will do tomorrow, you just toss a coin. If it comes up heads, the market will rise; if tails, it will fall. The theory has a 50 percent success rate. Most big investors are not willing to pay much for that type of information. Nevertheless, the theory has powerful academic arguments and empirical evidence favoring it.

Unfortunately, the efficient market theory cannot distinguish actual stock price behavior from investments by a colony of baboons whose stock purchases are driven by serially uncorrelated hormone surges. In recent years, the efficient market theory has come under attack by both the popular press and academics. Consider first some amusing popular exceptions to the theory.

Popular Theories of the Stock Market

The first exception is the "Super Bowl theory." If you want to know how the stock market is going to do this year, simply look at the Super Bowl outcome in January. If an NFC team wins, the stock market will do well; if an AFC team wins, the stock market will do poorly. In January of 1990, an NFC team won the Super Bowl (San Francisco beat Denver). The theory predicts that the stock market should do well in 1990; if Denver had won, the stock market would not do as well.

The adherents to this theory note that in the 1970s, AFC teams were winning most of the time and the stock market was doing lousy. Then the NFC teams came back and won mostly in the 1980s and the stock market did well. On the surface it would appear that this theory is a more focused predictor than the efficient market theory. The fallacy in the theory is correlation without causation: Super Bowl winners are probably related to stock market movements by chance.

A less well-known though equally amusing theory is the "hoot owl theory." My wife, Fran, has a good friend named Phyllis Metcalf whose father discovered this one. Apparently, Phyllis's father did well in the stock market back in the 1950s and 1960s. He lived in the country and picked his stocks as follows. At night, he would sit by his window and listen to the hoot owl outside. He knew Morse code so he would write down dots and dashes corresponding to long and short hoots. This owl would hoot in sequences of two to three letters at a time. Two or three letters correspond to the average length of the ticker symbols for firms on the New York Stock Exchange: IBM as an abbreviation for International Business Machines, etc.

Phyllis's father would buy stocks the next day based on the signals he was receiving from

his hoot owl. Apparently, he made money in the 1960s using the method. But then so did everybody else: the market rose significantly in the 1960s, so that any random buy would work. Hoot owls are smart, but not necessarily smarter than baboons or investment bankers. One hole in the theory is the following: was the owl was transmitting buy or sell signals? Clearly, this theory needs more work.

The next popular theory, the "thoroughbred horse theory," is one that failed. It is really more of an observation than a theory. In the 1970s, word spread that thoroughbred horses were a better investment than the stock market. I don't know whether Nixon, Ford, Carter, and OPEC caused this, or what. In any case, the stock market went to the dogs and so the smart money switched to horses. In fact, thoroughbreds increased in price from $8,000 in 1970 to about $30,000 by 1980, which is better than an investment in the stock market. This theory was like a lot of academic theories: it ignored some fairly important details like the transaction costs of horses. The cost of rent, food, shoes, equipment, veterinary bills, and trainers knocks $11,000 right off the top. After all costs and the time value of money is taken into account (expenses go out well before the winnings come back), horses did not do as well as stocks. It took a lot of research to figure this out. As my dad says, this is why we call it "research" instead of "search."

The next hypothesis is the "full moon theory." It was developed by one of my MBA students, Bjorn Olsson, who was an exchange student from the Rotterdam School of Management in Holland. Bjorn observed that the behavior of some fish is explained by lunar cycles. For example, the new moon closest to the vernal equinox is correlated with the salmon hormone thyroxine that triggers California salmon smolt to migrate to the sea. Apparently fisheries are using this information to determine the best time to release fishery-bred baby salmon to increase their survival rates. Olsson also cites scientific studies that use lunar cycles to explain the plankton feeding habits of small nocturnal fish. Olsson hypothesized that if full moons can affect animals and if humans follow instinctual hunches when they buy stocks, then maybe full moons affect the stock market. He put some data in the computer to see whether stock movements on the days of full moons looked any different from stock movements on other days.

Believe it or not, the moon theory worked. While new moons had no effect on the S and P 400 Industrials, full moons had a significantly positive effect. The market was up 0.1 percent more around full moons than during other periods. The possibility that this effect could have been achieved by chance was only 2 out of 100.

The next popular theory is the "hemline hypothesis." The stock market and hemlines move together: when skirts are up, so are stocks and vice versa. In the 1920s, we had flappers with short skirts, and the market went up; in the 1930s, the market went down and so did skirts; in the 50s and 60s, skirts and the market were up; the 70s were lousy and the skirts were down; in the 80s, the skirts went back up and so did the market. The interesting thing about this theory is that it may not be due just to chance. Steve Isser suggests that both phenomena may be driven by common underlying economic shocks. When times are good, the market reflects this. People take more risks and get more playful, which explains the shorter skirts. When times are bad, the market falls, and people become more conservative in their behavior, including their dress. According to this view, neither phenomenon explains the other; they are both merely consequences of underlying economic shocks. This concludes the examination of popular theories.

Academic Anomalies in Stock Market Behavior

Consider now some of the academic research dealing with anomalies that cannot be explained by the efficient market theory. Recall that efficient market theory claims that whatever stock prices are today is the best forecaster of what stock prices will be tomorrow. Consider a theory that says anything else: e.g., that today's price is usually too low a predictor of tomorrow's price. In this case, smart money will catch on and be in there buying stocks, pushing up the market until it is just right. If they push it too high, other smart money will sell, and it will go back down.

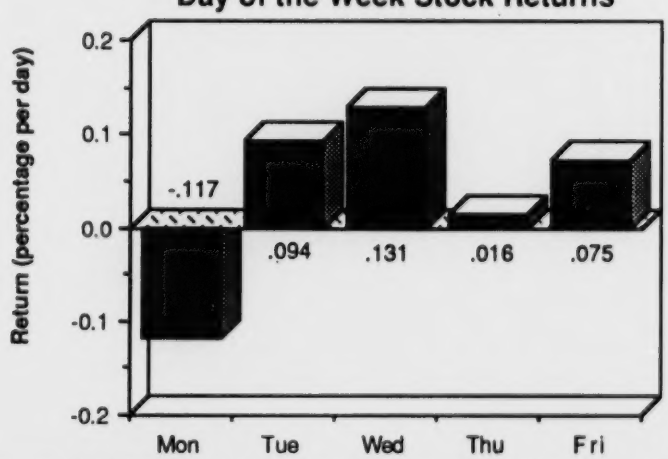
The theory appeared to be logically unassailable until some pesky academic researchers came along and starting finding persistent exceptions in the data we call "anomalies." The daily average return during the week is 0.05 percent. However, some days are much better than others: Tuesdays, Wednesdays, and Fridays are above average while Thursdays and Mondays are below average. The Friday-Monday effect has been studied in some depth, and the current view is that firms release negative information about their firm on the weekend. This allows the market more time to assimilate the information. The results reported in figure 1 are taken from a study by Rogalski (1984). Subsequent work (Smirlock and Starks 1985) has been done explaining the phenomenon.

This is a paradox because large institutional investors have billions of dollars in portfolios with low transaction costs. So they should be taking advantage of it. They should buy on Mondays and sell on the up days. This would cause the daily returns to be more equal.

The next anomaly is the "turn of the month effect." Ariel (1987) and others have worked on this problem. There are four days of the month when the market does very well: the last day of the month and the first three days of the next month. For the rest of the month, the return is a lot lower. So, most of the stock market increases in a year occur on these 48 days. (These results are shown in figure 2.)

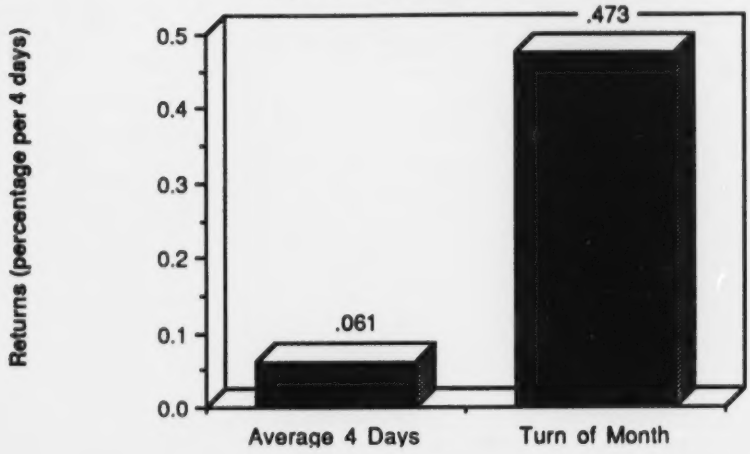
Figure 1

Day of the Week Stock Returns



Source: Richard Rogalski, "New Findings Regarding Day-of-the-Week Returns over Trading and Non-Trading Periods: A Note," *Journal of Finance* 39 (December 1984).

Figure 2
Turn of the Month Stock Effects



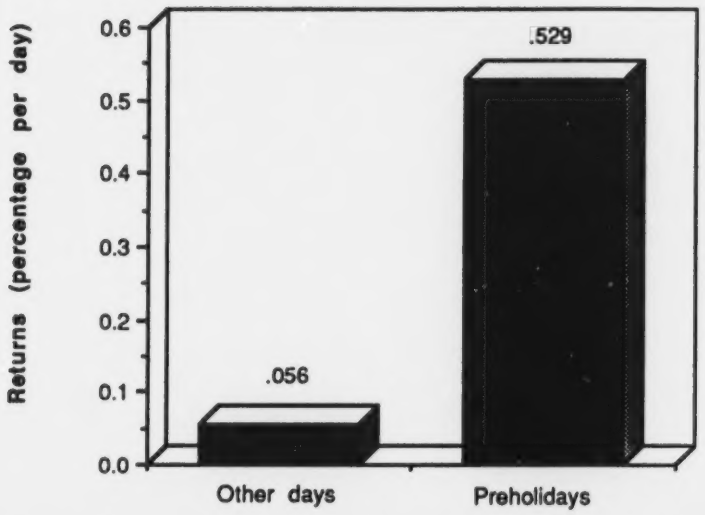
Source: Robert A. Ariel, "A Monthly Effect in Stock Returns," *Journal of Financial Economics* 18 (1987).

What is the explanation? A liquidity theory would suggest that people might buy stocks at the first of the month and then sell them toward the end when random individuals ran out of all other sources of funds. Again, this flies in the face of efficient market theory, which says that anticipation of this behavior, particularly by large institutional investors, would unravel it.

Another anomaly reported by Ariel (1985) is the preholiday effect, shown in figure 3. Because Ariel's study is unpublished, the amount shown in the figure comes from Lakonishak and Smidt (1988). The implication is to buy before a holiday. Again, this is an anomaly that runs counter to the efficient market hypothesis.

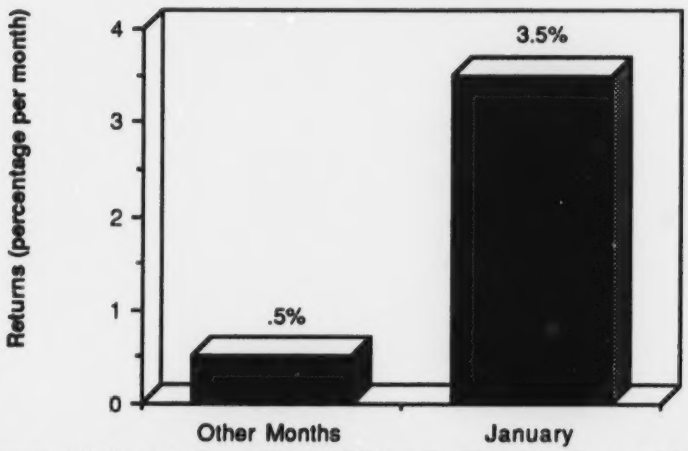
The next anomaly is the January effect. A major chunk of the annual increase in the stock market occurs in January. The other months do not do very well. One of the early studies of this phenomenon was by Rozeff and Kinney (1976), whose results are reported in figure 4. The most popular explanation for the January effect is tax-loss selling: individuals who have stocks with losses can sell them in December to reduce their capital gains taxes and repurchase the same stock in January. Interesting work by Seha Tinic found that January is the only month in which stock market returns differ from zero (Tinic and West, 1984).

Figure 3
The Preholiday Effect



Sources: Robert A. Ariel,"A Monthly Effect in Stock Returns," *Journal of Financial Economics* 18 (1987); and Josef Lakonishak and Seymour Smidt, "Are Seasonal Anomalies Real? A Ninety-Year Perspective," *Review of Financial Studies* 1 (1988).

Figure 4
The January Effect



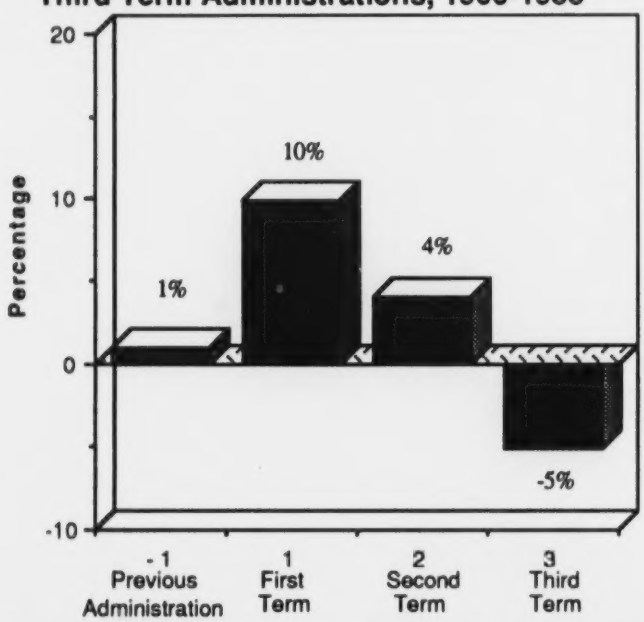
Source: Michael S. Rozeff and William R. Kinney, "Capital Market Seasonality: The Case of Stock Returns," *Journal of Financial Economics* 3 (1976).

The Third Term Effect

Consider now the effect of politics on the stock market. I have just finished a 17-year study of the interaction of politics and economics in determining U.S. international trade policy. An interesting fact that emerges from this work is that since 1900, the longer either party controls the White House, the worse the stock market performs. I do not have a good theory to explain this. A simple explanation is that the longer you leave them there, the more they haul off what isn't nailed down. We might call this general effect "diminishing returns to politics."

The third term effect is illustrated in figure 5. The average annual stock returns just before a change in parties is barely positive. This probably explains why the parties changed: if the stock market and the economy do poorly during an administration, that party has a hard time retaining office. Once the party changes, the economy does well during the first term, not so well during the second, and abysmally during the third term. The stock market data underlying figure 5 and succeeding diagrams are based on average values during a year rather than end-of-year values.

Figure 5
Annual Stock Market Changes for All First, Second, and Third Term Administrations, 1900-1988



Source: Stephen P. Magee, William A. Brock, and Leslie Young, *Black Hole Tariffs and Endogenous Policy Theory*, New York: Cambridge University Press, 1989.

One problem is that in this century, we have only three observations for third terms. First, there was a stock crash under Teddy Roosevelt in 1907, which was a third term (McKinley was elected in 1900, and Teddy Roosevelt was reelected in 1904). The second third term was Herbert Hoover's well-publicized 1929 stock market crash, which led to the Great Depression. Hoover followed two other Republicans, Harding and Coolidge. The third third termer was Franklin Roosevelt, who succeeded himself in 1940. Even if you take out Herbert Hoover, third terms are still worse than second terms. Third terms yield actual declines in the stock market.

The implications for George Bush's administration are weakened because history does not repeat itself and there are only three previous third termers this century. On the other hand, the strength of the theory is that both the second and the third terms display diminishing returns to politics.

The Decade Effect

While doing the previous research, I noticed a decade effect. This effect holds as far back as the 1870s. Table 1 reports the underlying data for the Standard and Poor's 500 Index. Notice that since 1870, every single even-numbered decade has outperformed every single odd-numbered decade except for the 1950s. Both the 1920s and the 1950s were strong because they were post-world war decades. The graphic presentation of the data in figures 6 and 7 is equally dramatic; figure 8 summarizes the results.

Table 1

The Decade Effect
Average Annual Increases in the S and P 500

	Odd Decades	Even Decades
1870	-0.9	
1880		3.4
1890	2.3	
1900		5.6
1910	-0.6	
1920		9.3
1930	0	
1940		4.1
1950	13.6	
1960		6.3
1970	1.6	
1980		12.6
Averages	2.7	6.9
Averages excluding outliers	.5 (1950s)	5.7 (1980s)

Figure 6
Stock Market Movements in Even Decades

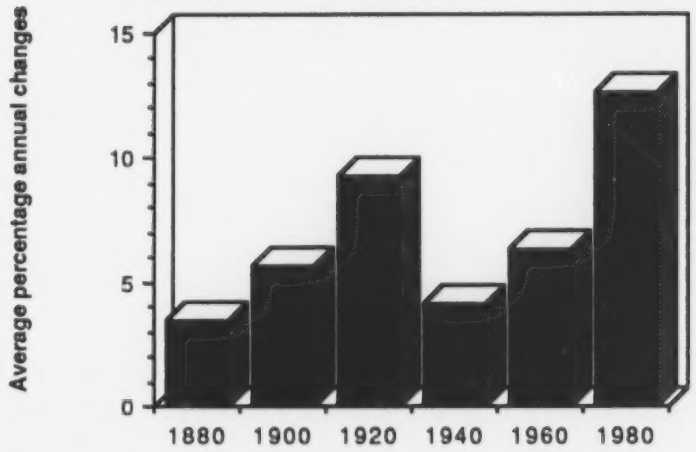


Figure 7
Stock Market Movements in Odd Decades

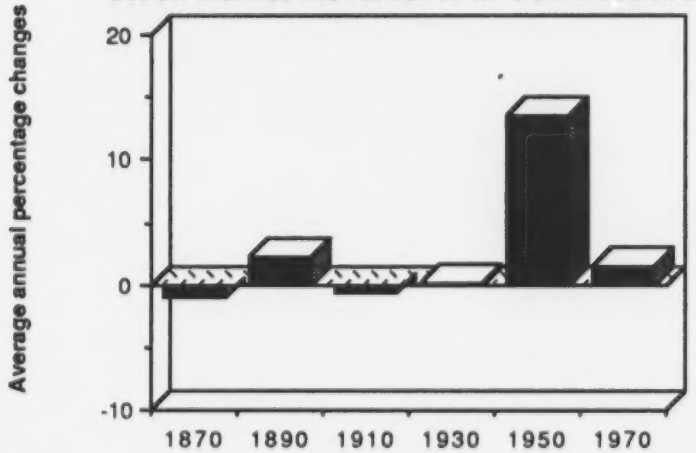
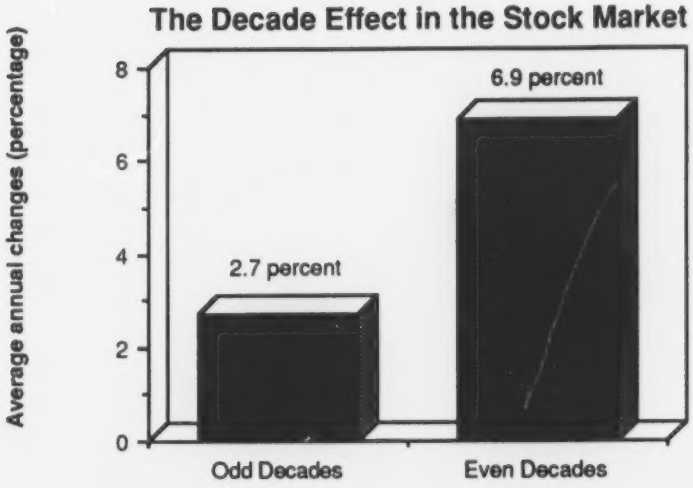


Figure 8

The Decade Effect in the Stock Market



What are the implications for the 1990s? If history repeats itself, the 90s will be a time of "malaise," which Webster defines as "a lack of health ... accompanying the onset of an illness." I am less confident that Batra's (1987) disaster thesis (the "great depression of 1990") will materialize, although my third term effect plus the decade effect are not inconsistent with it. I do not believe that the United States will repeat its last big economic mistake. Economists have learned too much since the 1930s about monetary and fiscal policy to repeat the Great Depression. Nevertheless, there are two other potential economic menaces in the future: a trade war and excessive litigation.

Threat Number One: Japan and Trade

Many of us view the Japanese stock market as greatly overvalued. Its price-earnings (PE) ratios are much higher than other advanced countries. The PE ratio for the Tokyo stock exchange is about 50 to 1 (September 1989). The Japanese PE ratio is high, even when adjusted for their very different way of accounting for their corporate earnings. At the same time, the U.S. ratio is about 14 to 1, and there are many other advanced countries with even lower ratios than the United States. If there is any parallel with the U.S. stock market in the 1920s, it is the Tokyo market now. Unfortunately, we have been saying that the Japanese market is overvalued for ten years. The thing has never adjusted, so we really do not know when, if ever, it is going to adjust. A major downturn in Japan would hurt Detroit and other import-competing sectors in the United States as Japan would push its exports even harder than before.

The Achilles heel of future trading relationships between the United States and Japan is Japan's low import to GNP ratio. If there is a major downturn in the U.S. economy, Magee, Brock, and Young's (1989) study of endogenous protection indicates that political pressures will grow to restrict imports from all countries, especially Japan, because of failure of Japanese reciprocity on trade matters. This is destabilizing because a trade war can exacerbate the already fragile economic situation, as we found with the Smoot-Hawley

tariff that contributed to the onset of the Great Depression in 1930.

Threat Number Two: Redistributive Litigation

A bigger threat than either a stock market decline or a trade war is the growth of redistributive litigation. Redistributive lawyering, lobbying, and rent seeking are described in Magee, Brock, and Young (1989). The economic decline in the United States brought about by excessive litigation is illustrated in figure 9, which is taken from Chapter 8 of Magee, Brock, and Young (1989). This result could be avoided, but only with a major change in current behavior.

With regard to lawyers, the United States is not exactly associating itself with world powers. Notice the company that the United States keeps in the diagram: Costa Rica, India, Bangladesh, Chile, and Nepal. The United States is similar to these countries in having more lawyers than doctors and slow economic growth.

An interesting consequence of these results is that some of my lawyer friends are more alarmed about this than anyone else. The plaintiff lawyers all think the defense lawyers are the problem and vice versa.

The data in figure 9 use the number of lawyers in approximately 1983. In that year, the U.S. had 565,000 lawyers compared to about 440,000 doctors in 1980 (see Magee, Brock, and Young 1989, p. 121). By 1989, the number of lawyers was up to about 750,000 according to *Business Week* (November 6, 1989, p. 34). A destructive aspect of this is the drain of society's most talented individuals out of the creative process and into redistribution.

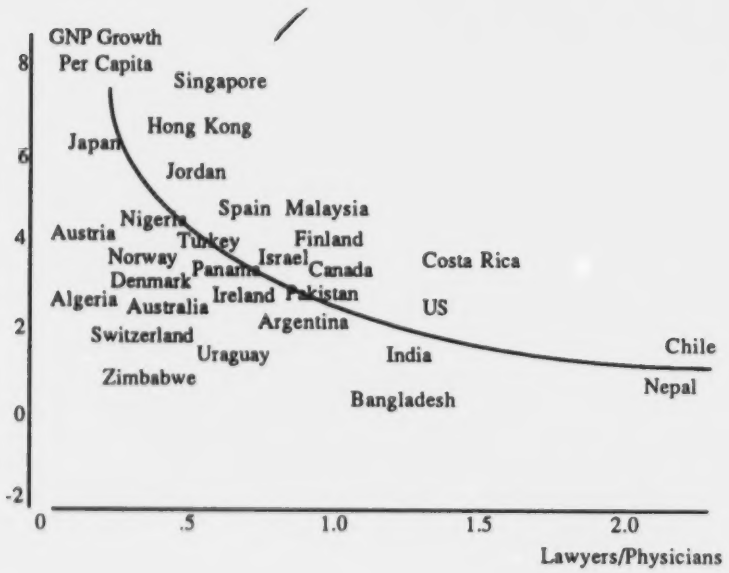
Furthermore, we cannot escape to the Philippines. There is anecdotal evidence that the Philippines has more than 5 lawyers per doctor, which puts it clear off the chart. Maybe Marcos was not the real problem.

A Proposal for Dealing with the Lawyers

It is important to reduce the amount of redistributive litigation. But how can the number of lawyers be reduced? At first glance, this would appear to be impossible, given that over 60 percent of the U.S. Senate and over 40 percent of the House of Representatives are lawyers. Further, lawyers hold major policy positions in legislatures and governorships, not to mention the judiciary.

One proposal would make everybody happy except the law schools and the aspiring lawyers. This is a Constitutional amendment that would limit American law school output and admissions to the bar. Even if no new lawyers were admitted to the bar, it would take nearly four decades to get our lawyer-doctor ratio down to current Japanese levels.

Figure 9
GNP Growth Per Capita 1960-1980 Versus Lawyers/Physicians



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Stephen P. Magee is the Fred H. Moore Professor of Finance and Economics at The University of Texas at Austin. He has also taught at the University of Chicago and the University of California at Berkeley. During 1972 and 1973 Magee worked for the Nixon administration as an expert on international trade policy and served on the Economic Advisory Board to the U.S. Secretary of Commerce in 1979 and 1980. He has authored several articles and books, including Black Hole Tariffs and Endogenous Policy Theory *(with William A. Brock and Leslie Young.)*

Zero Defect Manufacturing

by Hirofumi Matsuo

Introduction

"Made in Japan" means good quality. How do Japanese manufacturers produce high quality products? What is total quality control? How could U.S. manufacturers improve the quality of their products? Quality is one of the most serious but elusive concepts every manufacturer has to address in order to compete in the global market.

The purpose of this paper is to introduce managers, whose primary responsibility is not in manufacturing, to the efforts necessary to produce high quality products. We emphasize that company-wide and coordinated activities are indispensable to survival in the competitive market.

Let me start by defining quality in a conventional sense. There are three types of quality: design quality, performance quality, and conformance quality. Design quality refers to the inherent value of the product based on the choice of inputs and the perceived value by consumers. For example, where the inherent quality of beef is concerned, USDA prime is the best grade. Mercedes Benz is considered one of the best cars in the design quality sense. Performance quality describes product reliability and customer satisfaction over time. A nonrefillable lighter, for instance, is very functional and thus its performance quality is good as long as it works. Japanese cars, particularly the old lines of cars, provide another example of good performance quality. (Note that the quality of Mercedes and that of Toyota might mean two different concepts.) Finally, conformance quality refers to the consistency with which products meet design requirements. A steel shaft, for example, must be 1.0 inch plus or minus 0.05 inches to fit into a hole of a wheel.

Let us turn our attention to quality-related costs. There are four categories of costs: prevention cost, appraisal/inspection cost, internal failure cost, and external failure cost. Prevention costs prevent defects. They include costs associated with quality planning, new product review, training, process control, data collection and analysis, and quality reporting. Appraisal/inspection costs, incurred during the inspection and testing processes, ensure the acceptability of products or processes. These costs include raw material inspection costs, inspection and test costs, maintenance costs of test equipment, material and labor costs of such activities, and inventory evaluation costs. The internal failure costs are incurred within factories; external failure costs, after products are shipped. That is, internal failure costs include costs of scrap, rework, retest, downtime, and yield loss. External costs are associated with complaint adjustment, returned material, warranty, and loss of customer good will.

Typically, a U.S. manufacturer's total cost of quality amounts to 15 to 20 percent of sales dollars, a huge sum. It should be instead around 2.5 percent. That is a standard in Japan, where a penny saved through quality

improvement goes directly to the company's bottom line and its competitiveness.

Company-wide Quality Control

Kaoru Ishikawa, one of the founding members of Japanese quality control, defines total quality control (TQC) as follows: "TQC is the system for integrating quality technologies into various functional departments to achieve customer satisfaction." (In this paper, we use TQC simply to mean the quality control activities implemented by all functional departments of a company.) He defines company-wide quality control (CWQC) in broader terms: "CWQC is a means to provide good and low cost products that divide the benefit among customers, employees, and stockholders while improving the quality of people's lives."

There are four stages of CWQC, each of which a quality-conscious company develops over time. They are statistical quality control (SQC), TQC, product and process design, and quality function deployment.

Statistical Quality Control

Statistical quality control was initiated by Walter Shewhart and W. Edward Deming in the United States and imported to Japan right after World War II. It was readily accepted by Japanese management as a tool that would increase their competitiveness in the world market. Based on data collection from machines and statistical analysis of the data, SQC is the important first step toward quality improvement in the sense that objective and scientific methods are incorporated to improve a rather subjective and elusive concept of quality.

SQC includes several steps, the first being inspection of both raw materials and finished products. Next comes in-process control. Here, the states of machines are statistically categorized into in-control and out-of-control. The variability of quality measures produced on a machine is kept track of over time. As soon as the machine is identified to be out-of-control, it is repaired. In this way, we can avoid defects produced by out-of-tune machines. The third step of SQC is the quality circle. The quality circle is a group activity, usually consisting of a dozen people. They meet once a week to discuss issues and formulate proposals related to quality, productivity, and safety matters. Toyota started quality circle activities with one proposal per employee in 1960. In 1970, the number went up to 2.5 per employee with 70 percent of proposals accepted. In 1976, the number jumped to 15 with an 80 percent acceptance ratio.

There are seven tools commonly used in quality circles. Pareto analysis is applied in order to find a vital few, among potentially many, causes of defects. For example, it checks the number of defects caused by different reasons. Usually, 20 percent of the different causes account for 80 percent of the defects. After identifying the most frequent causes of defects, the company concentrates its corrective efforts. The second tool is the fishbone diagram, an invention of Dr. Kaoru Ishikawa. It schematically describes causes and the resulting defects. Therefore, it is called causal-effect diagram. The resulting figure looks like a fishbone with the head bone being a defect and all other bones

implying causes. Four other tools are standard and simple graphs and tables: check sheets, scatter plots, graphs, and histograms. The seventh tool is the process control chart discussed above.

Total Quality Control

Total quality control is a term that describes quality assurance activities that involve all functional departments: marketing, finance, accounting, design engineering, process engineering, and manufacturing. The implementation of TQC requires a strong management commitment. It also includes vendor management.

Education and training of workers are key elements of TQC. In order to improve process capability, people have to be improved first. Before they are regarded as regular productive employees, college graduates employed by major companies are usually trained and educated for the first six to eighteen months. During this training period, a new employee experiences various functions of a company independent of his college major. Over the span of a career, an employee is rotated through many functions. In this way, people gain a perspective about what should be done to maintain high quality from the inception to the sale of a product.

TQC may be characterized as quality control plus management. The emphasis is placed on teamwork. In Japan, the chief executive officer uses TQC to realign management. The CEO flags TQC as a goal, using it as a tool to demonstrate leadership. Quality control presentations are held to induce a festive atmosphere, and the Deming Award in Japan or the Baldridge Award in the United States can be the goal of the activities.

TQC is effective, but it can still fail. In order to understand what is lacking in TQC, we must review the notion of manufacturing strategies. There are four primary competitive priorities in manufacturing: cost, quality, time, and flexibility. We tend to think a manufacturing company should prioritize these four components. For example, a factory producing high-volume standard products must produce them at low cost to be competitive in the industry. Another factory producing a variety of products in low volume must organize itself to accommodate customers' various demands. Here, the cost becomes a secondary competitive issue. That is, cost and flexibility are regarded as two conflicting objectives. A factory must position itself by assigning priority to the four components.

What makes manufacturing challenging is the versatility of customers' demands. All personal computers can be different and all automobiles can be different. Purely standardized products are becoming rare. Therefore, flexibility becomes a necessity. On the other hand, because of a recent globalization of market, cost competition is crucial. Product life cycles are very short. Consumer electronics products, for example, usually have a life cycle of one year. High technology items can have a shorter life of six months. Therefore, a product designed and manufactured quickly becomes a necessity, too. Of course, high quality is also a must. Hence, a systematic method of improving the infrastructure of the company must be addressed in order for that company to excel in all four

competitive priorities simultaneously, rather than to trade off the four with present infrastructure as fixed.

The Taguchi Method: Product and Process Design for Manufacturability

The third stage of company-wide quality control involves the Taguchi method, which is sometimes called off-line quality control. It addresses product and process design. The purpose is to design a product and production process that make it easy to manufacture quality goods. In that sense, 70 percent of quality is said to be determined before production begins.

Taguchi uses cost to measure quality. He defines quality loss as the financial loss impaired to society after a product is shipped. In his book, he demonstrates the cost of quality by using the example of a company that is considering a new technology that keeps dress shirts from soiling and wrinkling half as fast as existing finishing technology. A dress shirt may be cleaned 80 times in the course of its life; each time it costs $2 dollars, resulting in a total cost of $160. The new shirt in this case costs $80 in its lifetime. Therefore, the quality benefit of the new technology per shirt is $80. Taguchi also explains a systematic way of setting process parameters and tolerances, which alone improves the production process.

Quality Function Deployment

The last step addressed in CWQC is quality function deployment. Here, a systematic way of incorporating the customer's voice is addressed. To be really competitive, manufacturers must produce what customers want and need. The method basically breaks down the customers' requirements from primary category into secondary, more detailed ones. Then, they are further broken down to tertiary descriptions of requirements. Thereafter, these detailed descriptions of customers' wants and needs are incorporated into components of products and process designs.

Process Flow Rationalization

Total quality control lacks systematic ways to address cost, time, and flexibility. The Taguchi method and quality function deployment address some of these issues. Process flow rationalization concentrates our attention to process in order to attain a smooth flow of material on the shop floor. Profit and cost are the major concern, but the short lead time and flexibility are also pursued. That is, all four competitive priorities are sought simultaneously.

Here a key is the reduction of work-in-process inventory, which is also the essence of just-in-time system. Process flow rationalization represents one way to achieve the just-in-time system. In every stage of product flow, we produce a necessary product through the elimination of wastes from lines and the introduction of the U-line process layout. (The word, waste, as used in the Japanese manufacturing management lexicon, refers to any activities that do not add value to a product. That is, a no-value-added activity is a waste.)

Imagine a straight conveyer line, 50 yards in length, where 20 workers sit and engage in assembly operations of a product. Identify what types of wastes, that is, no-value-added activities, are here. Waiting, for example, is a waste.

In such a long line, the slowest worker sets the pace. That is, 19 possibly efficient workers might be waiting or slowing down their pace in order to be nice to the slowest person. Another waste occurs when each worker picks a board from the conveyer and returns it after completion. While they are picking and placing, they are not adding any values. The long conveyer line can accommodate a lot of boards. While a board is waiting to be processed, no value is added. That is another waste. Usually, before and after the long conveyer, a large WIP is cumulated so that all 20 people can work all the time. This WIP, too, is a waste, as is rework. A large rework results from a large lot. That is, if one in a lot is defective then most likely everything else is also defective. This is why boards must be processed from one operation to the next with a lot size one. WIP should not be kept between two successive operations. Setup change is a waste here. Setups of all operations along the line must be changed at once. Because many operations are involved, the overall setup time of this line is very large. While the setups are changed, these workers may be idle--another waste. That neither encourages nor facilitates cooperation between workers. No automatic feeders can be installed to the conveyer. That is a waste, too.

We have enumerated types of wastes for the conveyer line. These wastes should be eliminated to achieve the four competitive priorities: quality, time, flexibility, and cost. One way is to layout lines in a U-shape. Here, the conveyer is eliminated. People carry a board one by one rather than use a conveyer. Accordingly, they work while standing. Each worker is assigned to several operations. So, workers must be trained for multiple skills. The supervisor is in charge of loading on and off so that he can pace the line speed and inspect all products for their quality. Everything from this line must be perfect. If the supervisor finds a defect, he stops loading a new part into the system and tries to find the causes of the defect and fix them immediately.

Let me summarize the benefits of the U-line with respect to the four competitive priorities. Quality is improved because the supervisor is in charge of loading on and off and of inspecting all products. Because a product flows in lot size one, there are only a small number of reworks. The quality feedback is quick, and causes of defects are found and fixed immediately. Therefore, the process improves over time. The U-line setting forces the workers inside the U-line to cooperate.

Because there is not much WIP inside the U-line, the production lead time is short. If the actual machine lead time is in minutes, then the transportation time is in hours, and the WIP time in days. Hence, reducing the overall lead time requires connecting machines and eliminating WIP.

In a U-line with multiskilled workers, the production rate can be changed easily by changing the number of workers assigned. If one line is reduced from five to four people, then the output rate is reduced by 20 percent. The persons eliminated from the line can be assigned to another U-line that requires higher output rates. Hence, the line is flexible in responding to the change in demand rate. Because frequent and quick setup changes are required, a technique of

quick setup change is necessary. Such a technique has been developed by Shingo Shigeo and is known as SMED (single minutes exchange of die).

Cost, too, is minimized with a small WIP. By eliminating storage places for WIP, usually one-third of a factory space is freed up. Less overhead is required to manage WIP. Fewer people mean a smaller payroll, as well as smaller overhead and fewer management costs. Higher quality reduces quality-related costs.

So, through process flow rationalization, we achieve just-in-time systems and satisfy all four competitive priorities.

Summary

We have glanced quickly at TQC, the Taguchi method, and process flow rationalization. Applying all three techniques can help the manufacturer realize the four competitive priorities: cost, quality, time, and flexibility. To implement and perfect these techniques, a manufacturing company has to revise its floor layout, organization, accounting procedures, vender relation, marketing functions, and corporate strategy. A competitive manufacturer in the global market should have the people and the system to produce products efficiently in the above four senses. This is a formidable task, but it can be accomplished over time with the cooperation of all company personnel.

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What Are *Sogo-Shosha* and Their Function in Today's U.S.-Japan Trade Relations?

by Yasutomo Katsuno

Review of U.S.-Japan Trade Relations and *Sogo-Shosha* (Japanese Trading Companies)

In recent years, not a single day has passed when we did not read a newspaper or magazine article about U.S.-Japan trade relations implying that Japanese money and technologies were going to dominate the world. I think it is an obsession. The worst of these articles, of course, emphasizes the responsibility of the Japanese for unfair trade practices, trade imbalances, closed markets, the current excess investments of Japanese money into the U.S. market, etc.

I would like to review the situation, explain our stand on this issue, and discuss how *sogo-shosha*, or Japanese trading companies, can contribute to the resolution of frictions. First, let's review the facts and figures on trade between the United States and Japan.

Table 1

Japan's Trade Balance, 1988
(billions of dollars)

Category	Amount
Exports	264.9
Imports	187.4
Balance	+ 77.5

Table 2

Japan's Trade Balance with the United States
(billions of dollars)

Category	Amount, 1987	Amount, 1988
Exports	83.6	89.6
Imports	31.5	42.0
Balance	52.1	47.6

Table 3

U.S. Trade Balance
(billions of dollars)

Category	Amount, 1980	Amount, 1987	Amount, 1988
Global	- 18	-152	-120
Japan	- 10	- 56	- 52
E C	+ 18	- 21	- 9
Asian NICs	- 3	- 34	- 28

Notice that the majority of Japan's trade surplus comes from trade with the United States, and approximately one-third of the total U.S. deficit is owed to Japan, which is irritating the United States.

But, we must also realize the following facts included in published statistics:

1. U.S. export to Japan in 1988 = $42.0 billion
   U.S. export to Canada in 1988 = $70.9 billion
   U.S. export to Mexico in 1988 = $20.6 billion

Particularly, U.S. export of agricultural products to:

Japan = $7.3 billion (20.7 percent)
E C = $7.5 billion (21.2 percent)

Japan is the second largest customer of the United States in these areas.

2. Also, Japan is the second largest investor in the U.S. market. Outstanding direct investments as of 1988:

UK = $74.9 billion
Japan = $53.0 billion
Netherlands = $47.0 billion

3. In May 1988, Japanese manufacturing plants in the United States numbered 837, employing 216,000.

4. Japanese companies in the United States make great contributions to the U.S. export activities. In 1986, $22.7 billion, or 10 percent of total U.S. exports, was contributed by Japanese companies situated in the United States. (For reference, France is second with $ 9.5 billion; Canada, third with $ 4.4 billion.)

5. Total annual sales of U.S. companies in Japan is $46 billion or 66.3 percent of total foreign companies in Japan. (This amount is just about equal to the U.S.-Japan trade deficit.)

Security Cooperation between the United States and Japan

Japan contributes nearly $3 billion annually to help defray the cost of maintaining U.S. military forces in Japan. (This figure was increased in 1987

Table 4

American Businesses in Japan

Company	Market share (percentage)
Schick (safety razors)	70
Polaroid (instant photography)	70
Coca Cola (soft drinks)	62
Johnson & Johnson (adhesive bandages)	28
IBM (computers)	27
Del Monte (tomato juice)	23
Johnson (wax)	20

to adjust for the appreciation of the yen.) Additionally, Japan spends $1.5 billion per year for defense procurement from the United States.

As we have seen in the above data, there are many factors we should not forget when evaluating a situation. I wish to stress that fair and unbiased observation on this subject is extremely important.

How These Situations Were Created

Although there can be thousands of reasons to explain the causes of Japan's success, the following are the main reasons:

1. Intensive education
2. Homogeneous nation/community
3. Industrial rationalization, efficiency
4. High saving ratio
5. New technology
6. Good management-labor relationships

Among the many factors mentioned above, I would like to take up the one fundamental reason for Japan's success: the homogeneity of the society, a characteristic formed during the evolution of the Japanese culture.

Historically, Japan has based its culture on farming, especially rice farms. There people formed a small community, helped each other, lived together, and died in the same community.

During the feudal period, this characteristic became more highly developed and emphasized. This social system applied not only to the farmers, merchants, and artisans, but also to the samurai, warriors who patrimonially belonged to one feudal clan and never left that clan. The farmers, merchants, and artisans were bound to their community by reasons of economy, but the samurai warriors were bound to their feudal lords by spiritual reasons--that is, loyalty--originating from Confucianism. An order from their lords was absolute, and they had no freedom to work for another lord. I believe these factors had very strongly

and fundamentally influenced the formation of Japan's modern society by the time of its introduction to the new world at the end of the 19th century.

During the isolationist period of the Tokugawa era, a unique system, called the 5-family neighborhood unit, was developed to control the people. Therein, they elected one leader who was totally responsible for mutual assistance, crime control, joint liability, and adjustment of litigation matters.

On the other hand, there was virtually no privacy within such a unit, and individualistic activity was absolutely impossible. The penalty for violating these rules was so severe that this system worked perfectly for its purpose and intensified the Japanese cultural traits of togetherness, joint responsibility, and the tendency to mutually solve any litigations or quarrels of any sort. The most important point was to maintain the harmony of the community; isolation from society meant the immediate destruction of oneself.

First modernized during the Meiji Restoration and ignited by Commodore Perry's approach, Japan leaped from a feudal society to an industrialized, modern country in a very short period of time. Therefore, it is no wonder that Japan's old culture remains a part of the modernized country and still influences today's Japanese economic system and philosophy. In people's loyalty to the company, in-house welfare systems, good management-labor relationships, and the priority of group interests over those of the individual, I see the deep roots of today's Japanese business society.

To explain some of these characteristics of society, I wish to draw upon some examples. One, it is well known, that Japanese companies do not lay off workers easily. Some years ago, when some Japanese industries were in danger of failure, an executive of a company reportedly said he could easily balance the company's financial situation if he could lay off workers at his own plant. The Japanese create the jobs to help each other even if one has to sacrifice some of his own benefits.

Second, the Japanese companies' business visions are generally much longer than those of the Americans, who show their joys and sorrows on each quarter's bottom line of the business performance. My own experience tells me that Americans look at the company as an apple tree, from which they try to reap the maximum profit in the shortest period. In contrast, the Japanese want to see that company grow big and strong so that even if we have to sacrifice some of today's profits, it will bear fruit for the next generation. Secretary of Commerce, Mr. Mossbacher, stated in a hearing of the Senate Banking Committee that the American companies' management should also adopt the Japanese business management concept--that is, long-term views--in the areas of investment and business planning.

Finally, the Japanese look at the company as their own society, where they belong, and they endeavor to make the company bigger and more secure for their own benefit. Maybe you can call it a religion in the sense that people's lives deeply depend on the company. Due to this attitude, it is very unlikely that the Japanese will attempt mergers with and acquisitions of other people's companies.

Such movement totally neglects people's pride and social structures.

What to Do

Japan's Role

Until the U.S. economy makes a soft landing--that is, balances its fiscal deficit and trade imbalance--Japan must sustain the world economy by expanding domestic demand and creating and providing more export markets for other countries, thus upgrading Japan's living standards. At the same time, Japan must contribute to international cooperation, organization, and foreign aid, while also expending more effort on the global environmental problems.

When we look into the details of U.S.-Japan trade, it is shocking to learn that a great percentage of imports from Japan is already locked in items and may not be improved. For example: 10 percent are items not produced in the United States, such as VCRs, facsimile machines, cameras, and movie cameras; 25 percent are products already built in the United States, such as engines and parts of automobiles; and another 25 percent are already controlled items, such as textiles, autos, TVs, steel, and manufacturing machines.

The U.S. Role

For its part, the United States must manufacture goods according to customer's needs and specifications. American manufacturers must also maintain their own industry by investment and technical development and realize that excessive money games may empty the industry.

What *Sogo-Shosha* Can Do

Japanese trading companies have been a driving force in Japan's economy in the past. (For example, our company, Sumitomo, has 120 offices in 85 countries, employs 8,500 people, has a gross trading volume of $112 billion and total assets of $35 billion.) In addition to strengthening the economy, Japanese trading companies can also serve these new functions:

1. By living in foreign countries; understanding the people of that country, their culture, and their needs; and operating trading activities according to those needs, we can serve as experts on the culture or economy in each country. In this way, we help the Japanese people understand that country and vice versa.

2. There are many overseas investments being made, and many Japanese are being sent overseas. We can guide these people to mix with the local community in an appropriate manner. By the same token, we can help foreign investors settle in Japan.

3. We can export U.S. goods overseas. As mentioned before, Japanese companies in the United States are contributing 10 percent of U.S. exports.

Table 5

Sumitomo America's Performance

	Percentage
Import from Japan	15
Export to Japan	55
Triangle trade	25
Trade within the United States	5

Sumitomo: An Example Sogo-shosha

Sumitomo, a large industrial group in Japan, goes back to 1630, when Mr. Masatomo Sumitomo started a medicine and book shop in Kyoto. Mr. Sumitomo, a son of a minor feudal lord, entered the Buddhist priesthood, then turned to business to help all living creatures as taught by Buddhism. Pursuing the business from this principle, he left the "Founder's Precepts" to his family and the members of his enterprise, and it later became the original text of "Sumitomo Spirit."

The original "Founder's Precepts":

1. Do not purchase an article offered below the prevailing market price without knowing its origin.

2. Do not give even one night's lodging to anyone.

3. Do not act as a guarantor for another.

4. Do not sell anything on credit.

5. Do not become angry and speak intemperately and harshly. Whatever the subject, speak patiently, over and over again. In Buddhist precepts, harmony must always prevail.

The essence of the precepts was rewritten in 1882 as "Business Principles":

1. Integrity, benevolence, and purity.

2. Sound management, rather than pursuit of profit for its own sake or easy gains.

3. Manage activities with foresight and flexibility.

The most important part is the emphasis on integrity, credibility, and planning with a long-term view. Pursuit of overnight profit is prohibited. We are very fortunate to have such guidelines in our business conduct, and we are astonished how well these words from 360 years ago fit into today's business scenario.

Summary and Conclusions

1. We are learning that culture can change. Japan is changing, but it takes time. Too abrupt a change might kill a good market for the United States.

2. We're also learning that an effort to understand each other is essential, that an attempt must be made to look at things from both sides.

3. By the same token, the United States, the dominating empire today, must listen to its neighbors. The decline of a super power often occurs by not listening to friendly neighbors.

4. Finally, Japan's trading companies are working on their own principles to become a solid bridge between our different and unique cultures.

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High Technology Competition Between U.S. and Japanese Companies

by Jim George

This topic deals with important matters between two very good friends, the nations of Japan and the United States. It is crucial to the futures of both countries that our political relationships and commercial interdependence go forward on a "win-win" basis. We have too much at stake to allow any other course of action to develop.

Japan, like most other countries, has developed a policy and a commercial strategy that matches their natural and human resources. We know from our own experiences that the Japanese thrust has been very strong in vehicles, such as trucks and automobiles, and is growing stronger in computers and communications. We all know the "C & C" phrase of NEC. We see the thrust coming into services. American bankers who think that their competition has been tough so far do not even know what is about to hit them.

A Japanese Formula for Success

I would submit that the Japanese have developed an almost shockingly effective formula for success, which they have used repeatedly. Basically, they pursue an industry based on its ability to provide stable employment and strong export markets. One example is the vehicle industry and its feeder industries, such as steel, glass, tires, electronics, and plastics. Another prime example is the computer industry, along with its feeder industries, including the semiconductor industry. Japanese companies make significant, effective, and focused investments in R & D, in production capacity, and in staffing. As we know, Japan enjoys significant cooperation among the government (e.g., the Ministry of International Trade and Industry [MITI]), industry, and academia.

Traditionally, these major efforts begin in the Japanese domestic market. The development programs bear fruit first in Japan. The country is not large and much of it is very mountainous, so the suppliers and other participants in an industry are often centered near each other. This proximity enhances cooperation and feedback in the course of product development. Typically, a very tough fight takes place on the Japanese domestic turf between hard-hitting competitors to see who can develop the best products most efficiently. Much of what we view as competition in this country pales in comparison with what goes on between and among Japanese companies. Often during this stage the Japanese adopt a policy of protecting their home industry, feeling that they need the protection of an "orderly market" against strong outside factors, to allow it to develop. This is often a period of intense domestic competition.

These focused developments tend to run in certain stages, and a significant investment in production capacity often occurs due to MITI guidance. In many cases, it is what we would conclude, by our standards, to be excessive. This phenomenon is not limited to Japan. The United States went through a phase in the

personal computer industry in which ten or fifteen companies each planned to have 30 percent of the market. In the United States, these firms are often small, extremely fast moving companies. In Japan, the typical participant is often a large, vertically integrated company that can afford to make a strategic investment in capacity.

The Japanese do not have the proliferation of innovative start-ups that we do here. Large companies in Japan implement a very long-term investment policy and a very long-term strategic planning policy, and they have the financial resources to sustain that approach. They can take profits from selling locomotives and building dams to finance the incubation period of a new high technology industry. Then, typically, after products have been refined and perfected in a very demanding domestic market, those companies that have been successful begin to export. There are exceptions to this. Honda, which we recognize here as an outstanding automobile company, was not considered one of the leading companies in Japan in their field. So it is not always the number one company that begins to export, but usually the leaders in their domestic market are the ones who begin to export.

These exports can be devastating to the targeted competition. They often take the form of a focused attack on a segment of the foreign market, e.g., the United States. We have not often seen the kind of competition that accompanies the initiation of exports: it is very direct and very effective, and it provides outstanding quality, often better than what we have here, and the fierce price competition necessary to crack the market. The low end of a market is usually attacked first, with expansion upward as successes are registered. In the early stages, capacity to manufacture extraordinarily large volumes is set up.

When those companies that are under attack wake up and realize what has hit them, one of several things generally happens. Some completely abandon certain market segments due to intense pricing pressures coupled with very good products; other companies fight it out. They find that they have to go through a period of price competition. Their margins and profits go down. In fact, they can incur very significant losses while they regroup during this period of time. In some cases, companies exit the industry or go out of business altogether.

In the next stage, the government of the targeted industry reacts in a manner that is influenced by the joint government/industry view of the situation. Often no action is taken, and often there is "jawboning" but no real action. In some cases, voluntary agreements are reached whereby the Japanese companies agree to limit their imports to some informal or formal level. In extreme cases, action may be taken under the antidumping laws of this country or other countries, resulting in the imposition of duties and quotas.

As a result of governmental reaction, the domestic industry typically enters a protected period. There can be voluntary quotas, such as with the Japanese automobile imports into the United States. Once the number was reached, and given the fact that this was an import quota on units, not revenue, everybody stopped selling the $5,000 car. Now we see the $35,000 cars, the new upscale models coming. It is an absolutely predictable course of action, given the cap on the number of units. There can be involuntary quotas. Italy, for example, has a limit of

2,500 Japanese cars plus 50 four-wheel-drive vehicles per year. The number is tied to the number of Italian cars sold in Japan. There can be informal *de facto* quotas. For instance, in France they decided that because they had a very large domestic VCR industry, they really needed to inspect imported Japanese VCRs. They hired just one inspector and put him in a small room about the size of a closet. This poor fellow could only inspect a few thousand VCRs a year. Somehow that was just all that came into the country. There can be duties, and, obviously, there can be other forms of agreements. One of the more controversial agreements in this country is the anti-dumping agreement in the semiconductor industry. There are people who think the Semiconductor Trade Agreement is very good, and there are people who think it is absolutely terrible. Whether good or bad, this is an example of an antidumping agreement that was negotiated between the two governments.

The final stage (what we are seeing) is also fairly predictable. The Japanese react in a way that is not at all surprising, given the fact that the protection mechanisms have moved through some sequence of progression. They set up operations in the other country. Some of their operations are very large and very well known. They tend to go through a progression that starts with what the Europeans call screwdriver plants, where subassemblies are basically put together with a couple of screws. Eventually the progression can result in very indigenous-like manufacturing concerns, starting with imported subassemblies, going to imported components, and eventually using components manufactured in the country, as the infrastructure develops.

Japanese Tactics and Skills

There clearly is an effective mechanism to bring this about. There are tactics and skills that allow this strategy to be executed repeatedly. One of the factors, I would offer from my experience in competing with the Japanese companies, is the extraordinary and effective cooperation and interaction between government and industry. It is really far beyond anything that we have ever used as the modus operandi in this country.

Number two is an important point. The cost of money in this country is too high. I am not an economist, and I do not know all the reasons why this is the case, but right now the cost of capital in the United States is not in our favor. If you are on the board of directors of a company and you have to borrow $500 million to make an investment, the cost of that $500 million in this country is at least two times the cost of $500 million in Japan. We know that the national deficit contributes to that imbalance, as does the low personal savings rate in the United States. Our economy is considered a higher risk and foreign investors need a higher return. Unless this high cost of capital is addressed, more and more investments will be made outside this country.

The Japanese have a well-educated and well-trained workforce. Much has been written on their impressive human resources. The networking among Japanese executives is incredible, a terrific time consumer. Virtually every night during the week, Japanese executives are with their work associates or with customers or with suppliers. For senior people this dedication extends to the

weekend. They will work on Saturday, and they often are required to meet with key customers or suppliers at least one night during the weekend. Weekend networking sometimes consists of golfing and other informal activities.

Japanese companies tend to have effective company cultures, a high degree of employee loyalty, and low turnover rates. In the semiconductor industry, Japanese employees are often transferred to different locations hundreds of miles away. For example, they may be relocated from a research center in Tokyo to a manufacturing plant in northern Honshu or to Kyushu. Because the housing is so limited in Japan and so expensive, the people who make these changes often leave their families behind. Many who come to the United States bring their families, but the people with whom I have experience in Japan do not move. They come home every week or so, and they simply live away from their family for two to three years.

The educational system there is very competitive. Parents do not want their kids to go down to the hinterlands of Kyushu if that means a possibly questionable school. Their children would miss a shot at getting accepted to the major universities in the country. In the United States we would not be able to persuade people to move eight hundred miles away and commute home every other weekend over a three-year period. In Japan, though, this is really not too uncommon.

The Japanese have longer range planning horizons, for which I have a great deal of respect. Somebody said their planning horizon is ten years and ours is lunch. This really is an advantage of their system. From what we can see, their planning mechanisms are simple and straightforward. The people have a chance to go out, work, and make things happen.

Their egalitarian employment policies, I think, are also impressive. For example, if you go into a major office building in Japan, there really are not any offices as we know them. The general office manager or the equivalent may have a small office, fifteen by ten with a small conference table. Essentially everybody else is sitting at rows of desks, facing one another. It is a very effective use of very expensive office building space. The communications are also much more effective. There is no obvious hierarchy or pecking order for what are sometimes pretty unimportant things.

Japanese compensation plans are different from ours. They do not use the kinds of stock options for managers that are found in the United States. Instead, they have a bonus plan. These plans, by the way, lead to the high savings rate because people are paid a base salary and then twice a year they get a bonus. If we were paid weekly, biweekly, or monthly and received a significant bonus every six months that was equal to 20-50 percent of our salary, we probably would spend part of it on some big ticket items. We would also probably put some money in the bank because it is easier to do with such a lump sum. Our consumption rate would be adjusted to a lower level, and we could use these bonuses to increase and facilitate the high savings rate. We all say, "My goodness, how do these Japanese people manage to save 15 percent of their salaries?" Part of it is this very predictable, simple plan. Conversely, in this country our standard of living seems to use everything we make because most of us are not on bonus plans.

I also would offer that some of the executive compensation I am seeing in this country is immoral. There is no reason whatsoever for executives either to be paid $10 million per year or to have compensation plans that give them a piece of the stock price if the value of the company goes up; take, for example, the chairman of Walt Disney getting $30 million in a year. It strikes terror in my heart that these kinds of compensation plans might, in effect, drive some people to make short-term decisions.

Semiconductors: An Industry Targeted by Japan

Let's look at how the Japanese use their tactical skills to compete in a targeted industry--in this case, semiconductors. (It is a strategic industry in this country and it is a strategic industry in Japan, so I will use the inflammatory term "targeted" in, hopefully, an objective sense.)

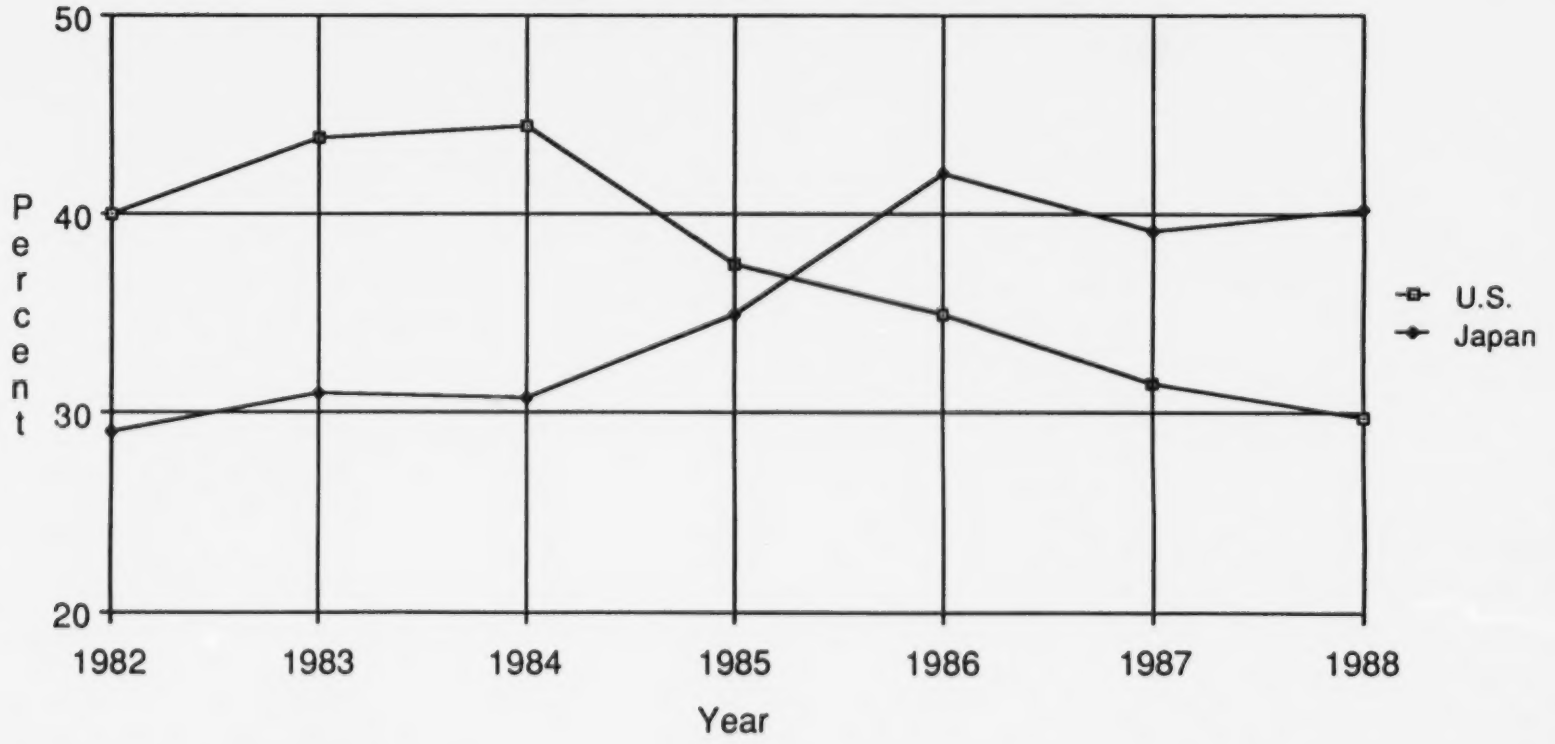
We have problems in this industry. Let me first start with the shifting U.S. and Japanese semiconductor consumption market. (I am not talking about production; I am talking about *consumption*.) As you can see in figure 1, the semiconductor consumption market in the United States peaked in 1984 when the personal computer industry went through a big run-up and a boom period. The Japanese market then represented about 30 percent of the world, with the remaining 25 percent concentrated in Europe and the newly industrializing countries (NICs) in Asia.

At that time we started to see a significant shift. The latest data in 1988 show that while the rest of the world is holding steady at 25 percent of the market, the Japanese market has now displaced the U.S. market as the number one consumer of semiconductors. Now there is an ominous foreboding here because the people who buy semiconductors are making electronic equipment, such as televisions and computers. The semiconductor content of such equipment, in round numbers, is approximately 5 percent of the final sales level of the system. In other words, as a general rule, if somebody sells a system like a computer, 5 percent of the purchase price is made up of semiconductors. Therefore, when you see that curve shifting to Japan for semiconductor consumption, you are also looking at the curve of the original equipment manufacturer (OEM) also shifting to Japan.

How are we doing with the share of the Japanese market? Clearly, from left to right in figure 2 there is not much change: U.S. companies' share of the Japanese market has run about 10 percent plus or minus one point for the last fifteen years or so. We have read a lot about side agreements and formal agreements and informal agreements and no agreements between the governments. However, nothing has really changed, despite an intense effort by the large Japanese companies, with MITI pressure, to increase the percentage. The graph scale does not show it very well, but U.S. share has gone up, from something like 9.5 percent to approximately 11.5 percent since the Semiconductor Trade Agreement in 1986. There also have been three points of substantial yen appreciation vis-à-vis the dollar. The dollar has gone from 260 or so yen to the present 140, and the Japanese industry has been able to maintain an almost militaristic export drive by taking a loss until they cut their costs or by shifting production to more cost-effective regions. Fundamentally, the conclusion here is that devaluing your

Figure 1

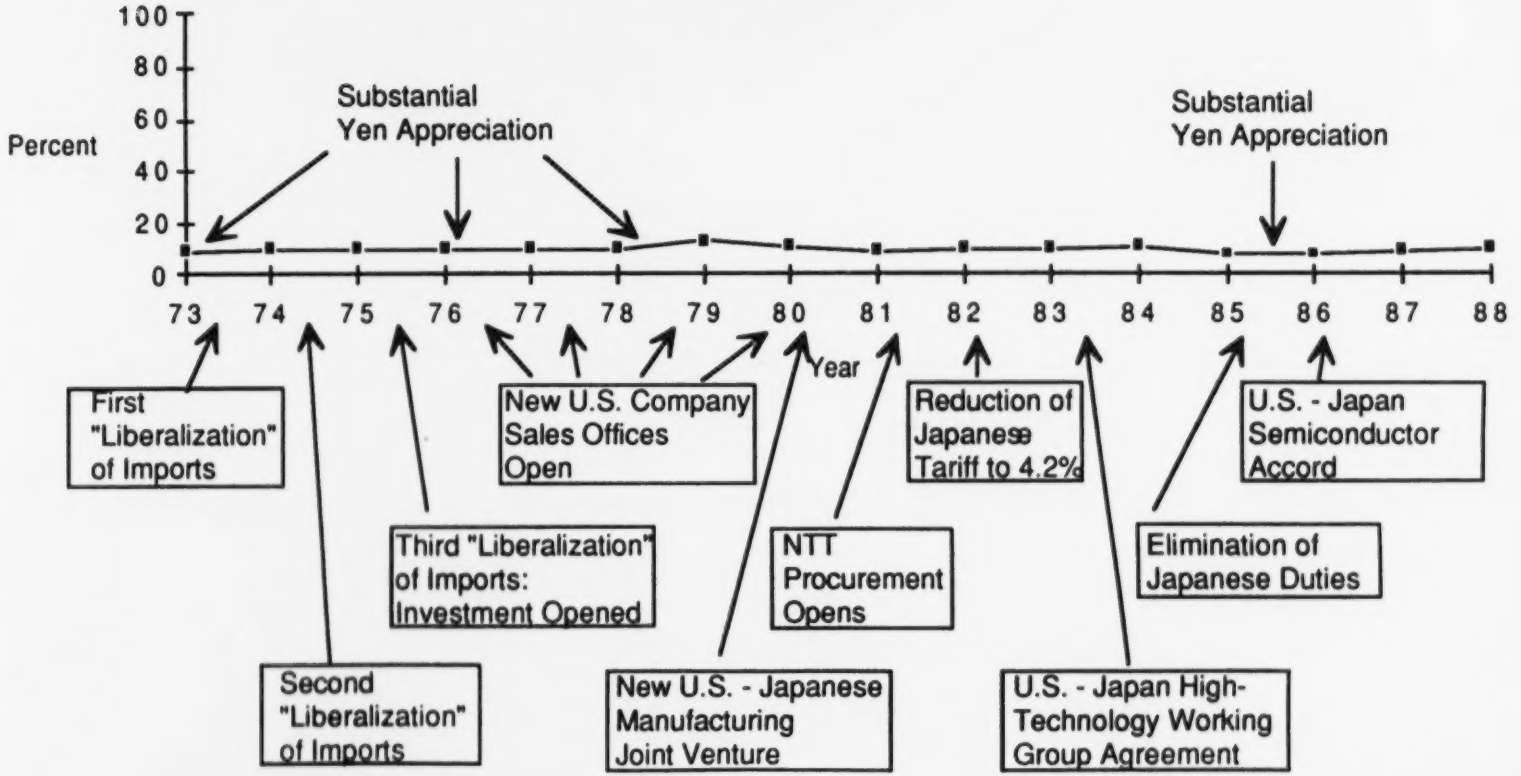
Semiconductor Consumption
United States and Japan Market Size
(Percentage of Total World Market)



Source: Semiconductor Industry Association

Figure 2

U.S. Share of Japanese Semiconductor Market



Source: Semiconductor Industry Association
Trading Places, Clyde Prestowitz, Jr.

currency really does not help your market access. That is probably not a very good long-term strategy.

If we look at world-wide semiconductor products shipments (figure 3), we see that in 1978 the United States pretty much ruled the roost. We were running at about 60 percent market share; the Japanese companies, at about 30 percent market share. Everybody else (ROW stands for the rest of the world) was running at about 10 percent. While there has not been much of a change in the rest of the world total, there has been a shift in its composition, with the Korean companies coming on very strong. I think we are going to see a large thrust from the major Korean conglomerates in semiconductors and also in electronics. The number of U.S. semiconductor vendors has dropped and the number of Japanese companies has increased. Clearly, the trend line is pretty continuous. There is a basic shift in share underway, and we do not know if that will change in the future.

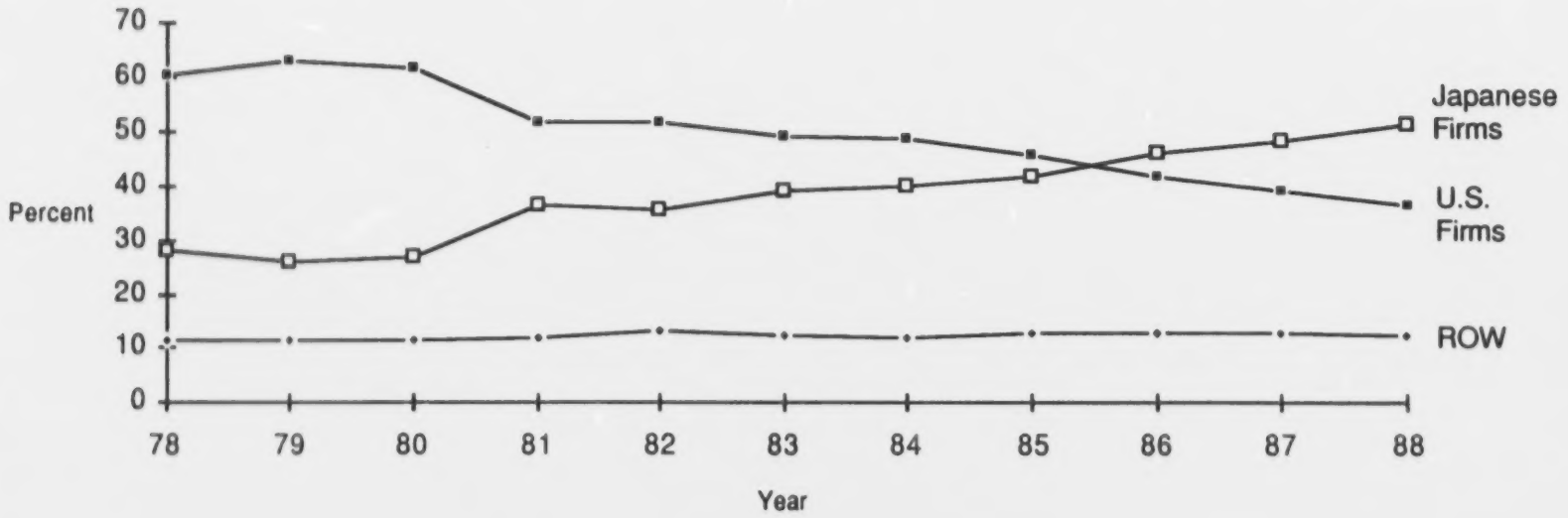
The driving product for making semiconductors is the processing equipment. Figure 4 shows the world market share for semiconductor manufacturing equipment. This is very important because the development of state-of-the-art process technology requires that you work closely with the vendors of equipment, modifying the prototype models, giving them effective feedback, and having access to the very leading edge equipment. In turn we, as semiconductor manufacturers, can incorporate that equipment in our latest process technology, and, in fact, can turn that into product benefit for our customers. Here again we see the same trends. Since 1979, the world market share of Japanese industry has increased very sharply, such that in 1989 the Japanese industry will cross over and be a little larger than the U.S. industry. Right now we are running about 45 percent each, with everybody else (basically all in Europe) still being about 10 percent.

Now, let us focus our attention on the memory chip business. In 1979 American memory chip suppliers dominated the world market (figure 5), and except for Japan in second place, essentially, there was nothing anywhere else. Since that time, the Japanese have come on very, very strong in memory chips. The Europeans really have not changed very much. The rest of the world number represents production in Korea, mainly by Samsung. Japanese market share is up to 90 percent in some areas of static RAMs (SRAM) and dynamic RAMs (DRAM). The United States right now maintains a lead in electrically erasable, programmable, read-only memories (EEPROM), and other non-volatile products.

We have a dilemma. Let me tell you what I want your conclusion to be before I explain table 1. I want the conclusion to be that we need *consistent* government policy. Look at this chart using the four megabit DRAM in the third column. The first column describes the technology. For the four megabit DRAM, it is 0.8 microns. The basic research for this started in 1980 with the equipment and the basic process technologies. Then in 1983 the development teams were doing what I would call applied product development. That means that they knew what the target specs were, they knew exactly what it had to do, they knew the pin configurations, and they could actually write a preliminary data sheet.

Figure 3

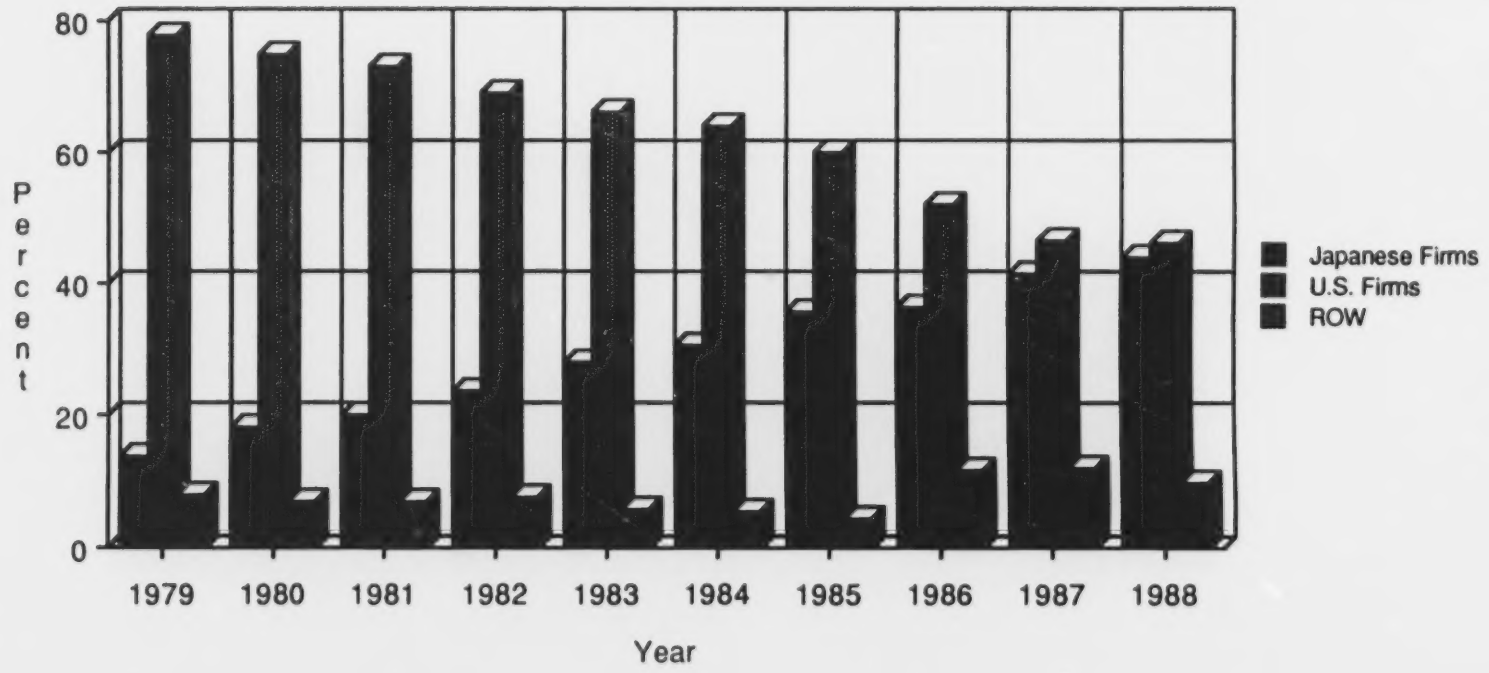
World Market Share
Semiconductor Product Shipments



Source: Dataquest

Figure 4

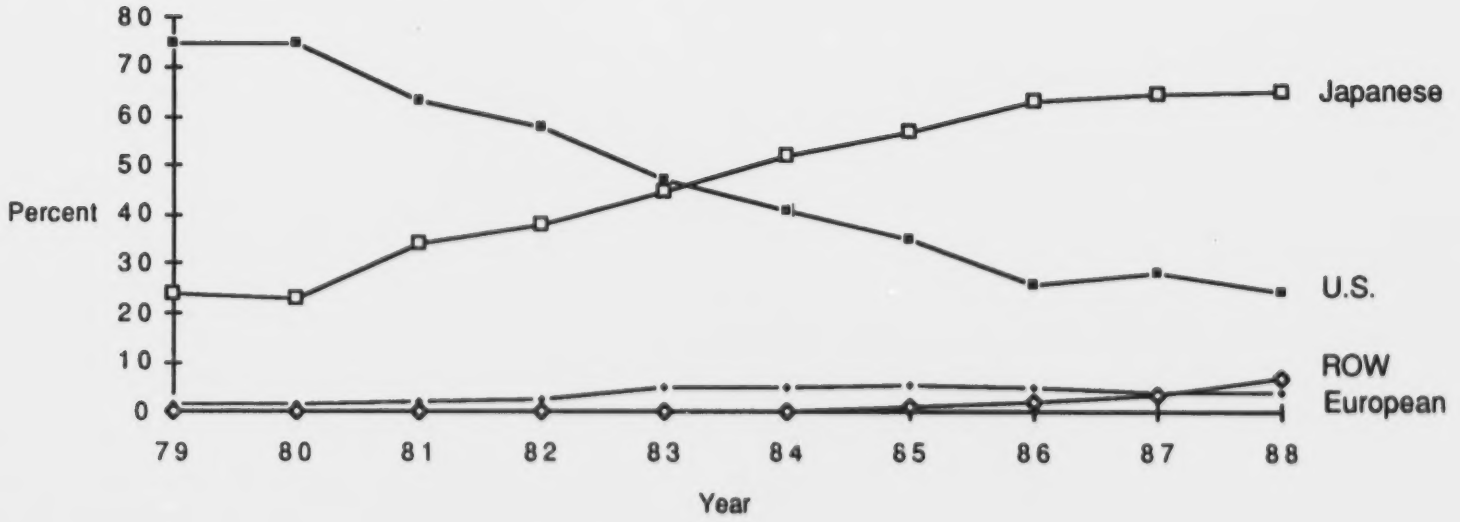
World Market Share
Semiconductor Manufacturing Equipment



Sources: Semiconductor Industry Association
Dataquest

Figure 5

World Market Share
Memory Products



Source: Dataquest

Table 1

Commodity DRAM and SRAM Memory Technology Roadmap (Industry)

Technology Generation	SRAM Product	DRAM Product	Research Start	Develop. Start	Intro. Date	Peak Output
1.8μ	64K	256K	1974	1977	'82-83	1988
1.2μ	256K	1M	1977	1980	'85-86	1991
0.8μ	1M	4M	1980	1983	'88-89	1994
0.5μ	4M	16M	1983	1986	'91-92	1997
0.35μ	16M	64M	1986	1989	'94-95	2000
0.25μ	64M	256M	1989	1992	'97-98	2003
0.15μ	256M	1G	1992	1995	'00-01	2006

NOTE: PEAK VOLUME YEAR OCCURS 2-3 YEARS AFTER THE SUBSEQUENT GENERATION IS INTRODUCED

It takes a long time to develop the process and design the product before it is actually introduced. This product was introduced in extraordinarily tiny volumes. The total production in Japan was maybe 10,000 pieces in the last quarter of 1988. We started to see production volume in the middle of 1989 by leading companies of maybe 10,000 to 20,000 pieces per month. So I would submit to you that there is about a five-year time horizon between the onset of applied product development and the introduction. Thereafter, the manufacturing unit peak does not even occur until 1994. The reason it occurs then is that something else better will come along, which will be the sixteen megabit DRAM. It will be introduced in 1991 or 1992, but initially it will be hard to make and really very expensive, and most people will not use it unless they have some extraordinary application. However, after two to four years, the price will decline to the point that it becomes more cost-effective.

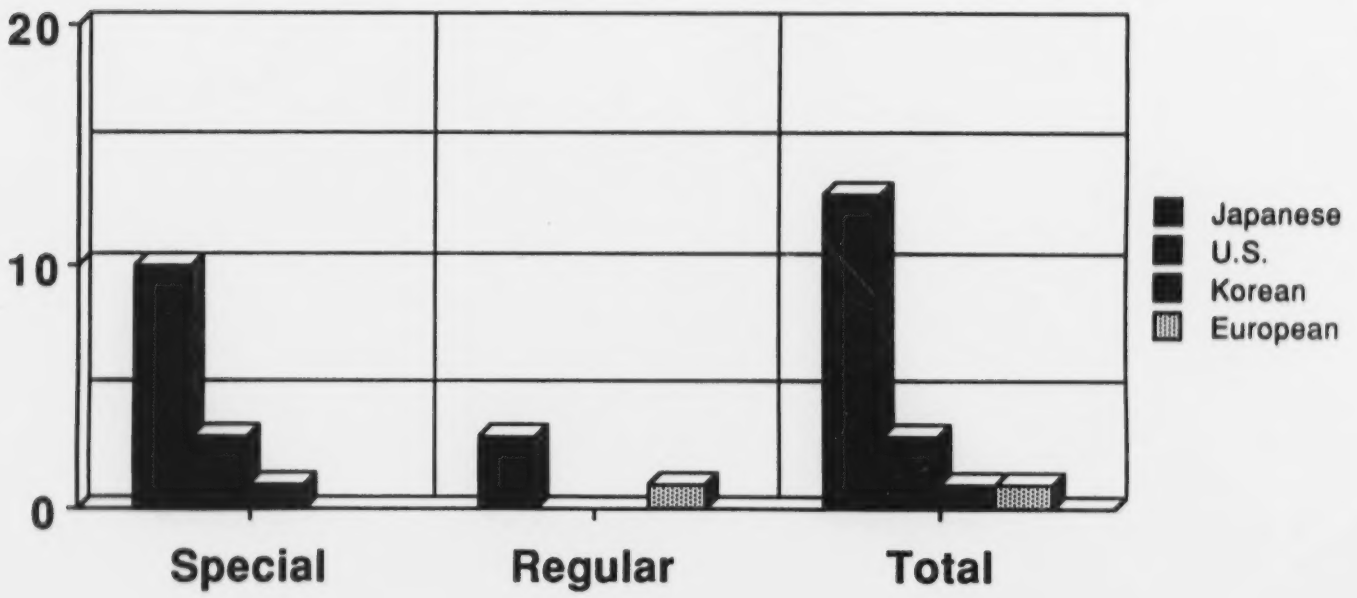
I would like to drive home my point about consistent government policy here. The DRAM business is so competitive that a new generation of technology comes along every three years, even though the development and peak volume production of each generation takes over ten years. In addition, this is an extremely capital-intensive business. A wafer fab for the four megabit DRAM will cost nearly $500 million. So far, no company has been able to remain the technology leader in DRAMs for two successive generations, and due to the tendency for prices to fall rapidly after introduction of a generation, only the early entrants recoup their investment. As a result, the existence of sound, consistent government policy is essential to participation of U.S. companies in the DRAM market. Any company that is going to spend $50 million a year on R & D and then put that R & D in a $500 million investment for every manufacturing plant really must have a solid policy framework in which to operate. We have used this chart with the U.S. government to make that point: whatever your policy is, please make it consistent. This is a very tough market. One reason more American companies are not making DRAMs is that we are really talking about big stakes and a long planning horizon.

What makes it tough for us is that we have lost the R & D battle to Japan at this stage. It is a pretty gloomy situation. As an example, figure 6 shows the nation of origin of the articles in a recent issue of the *IEEE Journal of Solid-State Circuits*. Thirteen are Japanese, two are American, one is European, and one is Korean. These are the papers that show the status of the research. The research will benefit greatly from the relationship with the equipment vendors, who are quickly going to Japan. And that produces the products with this six-year research and development horizon.

This industry is in trouble. You might say, "Well, who cares about the semiconductor industry?" Looking at figure 7, one can make the analogy of a food chain, starting off with little things that are then consumed by big things. In the food chain here we have materials, gases, and chemicals--all used in the manufacturing of the chips. The equipment industry also feeds into the production of semiconductors. Other high tech industries such as those that manufacture magnetics and magnetic read/write sensing devices and displays are very important. (The Japanese companies dominate the laptop computer industry right now because the

Figure 6

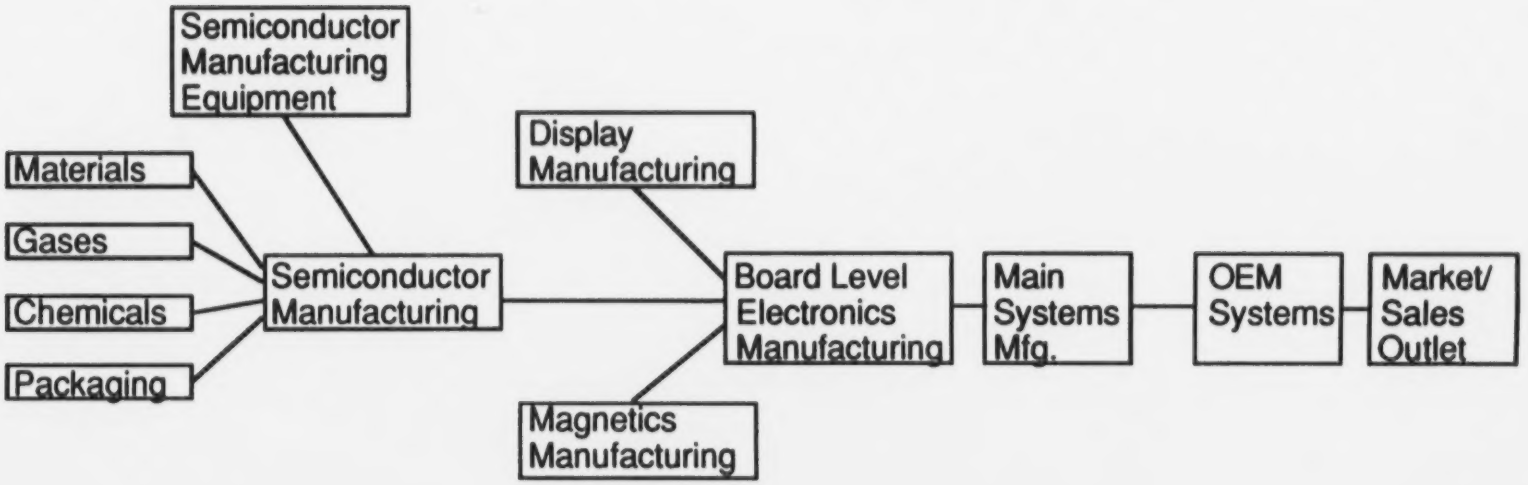
Company Affiliation of Authors
October 1989 IEEE Journal of Solid State Circuits
Memory Design Articles



47

Figure 7

"Food Chain" Analogy



American companies do not have the display technology.)

These industries produce products at what I will call the board level. Then from the board level, products go into system-level products. Finally, the OEM makes some of the system-level products and buys some. It is all part of an OEM complete system. It is then marketed through some series of outlets, stores, dealers, and trading companies and goes to the final consumer. If we lose the feeder industries, we are not going to do very well in the OEM industries because we need a competitive position in all of the basic structures. Now you may ask, "How big is the electronics industry?" The electronics industry in the United States is currently 20 percent larger than the total value of the automotive industry. So we are really talking about big stakes for employment in this country.

Factors for Success by U.S. Industries

I believe that American companies and Japanese companies can compete fairly. I believe that it is necessary for the future of both societies, as well as Europe, for that to happen. Working for Motorola, I have the benefit of being in a very global company. We manufacture memory chips, for example, in Arizona; in Austin, Texas; in East Kilbride, Scotland; in Sendai, Japan; and in Aizu Wakamatsu, Japan. The final assembly is done in northern Japan and in Kuala Lumpur, Malaysia. We supply customers all over the world. Our market share for DRAMs is the same in each of the major foreign regions as it is for the United States. In other words, we do not simply support American companies. In good times and bad, we make sure our Japanese customers get the same percentage share of their market as the American customers do.

From the experience of my company, I would submit that there are some basic things that we can do to achieve success. Number one is we must have Japanese market access. Without that, it is going to be very hard to compete in the semiconductor business. It is the largest market in the world, and it is growing most rapidly. If you write off 40 percent of the world's market and concentrate on the 60 percent that is left, the economies of scale really start to go against you.

A high level of commitment is necessary. People might think that the way to penetrate Japan is to open a sales office there, but that is not going to be adequate. In our case, we have grouped all of our Japanese market activities together--from communications and cellular telephones to semiconductor chips and automotive electronics--and put them under the *aegis* of Nippon Motorola Limited, along with major manufacturing sites in Sendai and in northern Japan. We then have a joint venture in semiconductors with Toshiba Corporation wherein we are cooperating on memory chips and microprocessors. Toshiba and Motorola own a large manufacturing plant fifty-fifty in Sendai, which was chosen because it is near Tohoku University, and it has a reasonably good source of labor.

An American company, number two, has to raise expectations to a world-class level. Most American companies have no idea what real world-class performance is. They have no effective benchmarks. It is very important to do effective benchmarking through purchasing other products or forming a joint venture with another company to find out what they do

and how they do it. We have a quality program at Motorola called Six Sigma, which means we want the processes to be controlled to six levels of standard deviation.

Making customer satisfaction a priority is number three among the basics. I wish I knew more about Japan, but I am learning a little bit. They have a saying there that the customer is god. They literally mean that and treat the customer that way. Americans, on the other hand, often think that the customer is a nuisance, an imposition on our time. Customers keep us from going to meetings and otherwise using time bureaucratically. We at Motorola have a measurement system for following up on the way we treat customers. Guaranteeing customer satisfaction means answering the phone on the first time, shipping every order on time all the time, never having a quality problem, meeting with customers at least a certain number of times per year, carrying pagers twenty-four hours a day, and making sure major customers know how to get in touch with the company.

Number four is to adopt a fanatical quality/reliability attitude. American quality often has been uneven, and we need extraordinary improvements in that area.

Number five, you have to understand the factors for success in your particular business. An associate of mine, Murray Goldman, who is the General Manager of the Microprocessor Group in Oak Hill, has a saying: "What are your silver bullets?" Forget about ten or twenty or thirty. What are the two or three silver bullets? Pay attention to the bullets all the time, make your list very short, with three or fewer key items for success on it, and then make sure that you do that.

The sixth key factor involves negotiations. Often you have to negotiate with the Japanese in terms of buying from them or selling to them or jointly doing something with them. It is very interesting. The contract in Japan is viewed a little differently than it is viewed in America. They write very simple contracts. We would almost call them naive, but that is the wrong word. They are simply different from our lawyer-driven contracts. The contract in Japan is a statement of intent and relationship. As the basis for continuing negotiations, it is always growing and changing, whereas when we write a contract, it is somehow written on a rock to be used when you sue them to make sure you get what you want. That is not the way the Japanese approach a contract. Clearly, on the other hand, you have to make sure that your key needs are covered in the contract, and you must beware of continuing discussions that chip away at the fundamentals that were the bedrock of your original intent.

Negotiations can only really move forward when you set up a schedule that allows time for consensus building within the Japanese team. Often we schedule meetings in the morning, break in the afternoon, and then meet again at supper and go late. Negotiating with Japanese companies is often an 8:00 A.M. to 12:00 P.M. around-the-clock process. Forget any eight-hour days. However, you must have time for consensus building and caucusing on both sides. Personal courtesies and rituals are also very important to the Japanese. Americans must be very courteous and not cause a person to lose face in a disagreement. After-hour discussions are very important in negotiations with the Japanese. One can be more informal, get feedback on what has

happened during the day, and build a good solid personal relationship.

The seventh factor for success is the tough customer/tough market strategy. Pick your key products and focus on success with the toughest customers because if you can do well there, you can do well anywhere. The Japanese companies are absolutely the toughest companies in the world, the proverbial "tough customer." Why fool around with the tough customer? For one thing, you learn a lot. Their engineering and their qualification sequence is going to be the toughest. Once you can satisfy them, you can satisfy anybody else.

On the other hand, we must lead in our domestic market as a minimum. The eighth factor then is closer and longer-term relationships with our domestic customers. We need virtual vertical integration. We do not have the large vertically integrated companies like NEC, Toshiba, and Hitachi. We have smaller companies, so we need to join together to get the benefits of a large company. This teamwork can involve partnering on research or having a systems company put money into a component company to assure the development of a key technology.

Number nine, strategic cooperation is needed to preserve the manufacturing equipment and the materials feeder industries domestically. If we lose the feeder system of manufacturing equipment, we are going to have a hard time competing because we are going to have to buy our equipment from the companies in Japan or Europe. It will be very difficult to maintain the intimate relationships required to be on the leading edge.

We have chosen in this country a key consortium to help support our equipment industry and preserve it. This is Sematech, located in Austin. The Japanese would never approach the problem with a Sematech. Instead, they decide they need basically five or ten or twenty companies making certain types of equipment. Some of those companies are already in existence, but some are yet to be formed. Those companies are, for the most part, in Japan. The big companies will buy into and invest in the equipment companies, either as a direct subsidiary or as a 30 or 40 percent investment, and they will essentially become a big brother to those companies. Magically, all of these relationships line up in about a year, and suddenly there are big brothers and little brothers. The big brother not only provides deep pocket funding, but also (this is very important) applications, information about what he needs and when he needs it, and field feedback on the new prototype pieces of equipment. We did not do it that way. We formed a consortium. I think the Japanese approach is probably more effective. It certainly works for them. It probably would have been better for us, but it is just not possible here.

Finally, number ten is the need to develop effective mechanisms for strategic research cooperation. We have MCC and the Semiconductor Research Corporation, which parcels out grants for basic research to universities. These cooperatives need to become more efficient. However, this is a tough task and major questions remain as to how effective this approach can be.

Factors for Success and U.S. Government Policy

What can the U.S. government do to maintain the competitiveness of American

industry? Industry itself has the main responsibility, but the government can play a very important role. First, they must act quickly to prevent dumping and to protect intellectual property rights. I believe the U.S. Department of Commerce and the U.S. Trade Representative may have saved the semiconductor industry in the United States when they forged the Semiconductor Trade Agreement in August of 1986. Many people protested that it made the price of memory chips go up, but as Dr. Noyce said, the memory chips did not go up because of the Semiconductor Trade Agreement but because the agreement came five years too late. Effective and timely mechanisms must be in place to prevent dumping. Punishment mechanisms are also important. They might need to be structured so that the final equipment using these components cannot be imported into this country.

Next, we need to lower the cost of capital. We must decrease the national deficit and increase the savings rate. Because if we do not lower the cost of capital to near what our competitors are paying, we are not going to be successful.

Also, we have to improve education. Too many high school graduates are not capable of coming into a company and working on the production line. Many cannot even read or write effectively and require a huge amount of training. Our training costs per employee are much higher than that of the companies in Japan.

Clearly, our government plays a role in encouraging Japan market access, both in pushing on the government of Japan and pulling on American companies. It is very hard to do. This is an expensive, long-term proposition to penetrate the Japanese market, and one has to be in it for the long term.

Finally, we have to accept that, as a nation, industrial competitiveness must be a top national priority. Without this, it does not really matter how much military force we have. We will fail from within, not from without.

Jim George is the Corporate Vice President and General Manager of the MOS Memory Products Division of Motorola Inc. He received a B.S.E.E. degree from Virginia Polytechnic Institute and his M.S.E.E. from Arizona State University. He has 25 years of experience in the semiconductor industry--nearly all with advance CMOS technologies and products. In his 13 years with Motorola he has also served as CMOS Operations Manager and MOS Group Reliability and Quality Assurance Director.

Foreign Direct Investment In the United States

by Mio K. Reynolds

Foreign investments in the United States--U.S. Treasury securities, corporate bonds, stocks, and real estate--have increased drastically. Factors driving foreign investment are multiple: relatively high real interest rates in the United States caused by low private savings and high U.S. budget deficits, relatively cheaper assets due to the depreciation of the dollar, and fear of protectionism.

The American public is concerned about the rising number of foreign investments. The merits and demerits of foreign investments in the United States have been discussed. While U.S. state and city governments are competing fiercely against each other to attract foreign investments (33 states and four port authorities have established offices in Tokyo, offering various incentives to attract Japanese investment), several bills are currently pending in the U.S. Congress that attempt to control and restrict foreign investments.

I focus here on foreign direct investments in the United States, particularly Japanese investments. First, I examine *public opinions* concerning foreign investments; second, *facts* concerning the foreign investment in the United States and U.S. investments abroad; third, *legislative activities* concerning foreign investments in the United States and their implications; and lastly, foreign investments in the U.S. steel industry as a case study. I focus my attention on foreign direct investment: the ownership, acquisition, or establishment directly or indirectly by a foreign individual, association, corporation, or government of 10 percent or more of the voting securities of a U.S. enterprise.

Public Opinions

Is foreign ownership of companies in the United States good or bad? According to a *Times Mirror* study of attitudes toward U.S. economic issues, 70 percent of the American general public state that foreign ownership of companies in the United States is a "bad thing"; 18 percent, a "good thing"; the remaining 12 percent, "don't know." However, a majority (58 percent) of the opinion leaders state that foreign ownership of companies in the United States is a "good thing"; 26 percent, a "bad thing"; the remaining 14 percent, "don't know."

Why is foreign investment in the United States good or bad? In that same study, the 18 percent who feel foreign investment is a "good thing" list various benefits of foreign investment: creating jobs (36 percent); stimulating the economy (28 percent); forming international bonds (12 percent); and creating open markets and encouraging fair trade (10 percent), among others. On the other hand, the Americans who feel that foreign investment in the United States is a "bad thing" list as their reasons: Americans should own America (36 percent); the threat that foreign investment presents to national security/control of country (20 percent); the loss of economic power/influence (17 percent); the loss of profits that go overseas (13 percent); the loss of jobs (11 percent), among others.

What are the favorable impacts of foreign investment on the American economy and American life? The March 1988 issue of *Foreign Investment* reported the results of two surveys--one of 1,003 adults; the other, of approximately 100 elected officials. A total of 59 percent of the general public, compared to 86 percent of the elite, believe that foreign investment actually creates new jobs in America. In similar proportions, 56 percent of the general public and 76 percent of the elite feel that foreign investment brings foreign business techniques to the United States. Also, 54 percent of the American public think foreign investment creates more competition and leads to lower prices, with 80 percent of the elite in agreement.

What are the unfavorable impacts of foreign investment on the American economy and life? A wide margin separated the general public and the elite in their response to this question. Compared to 39 percent of the elite, 74 percent of the American public feel that foreign investment causes the United States to have less control over its economy. Similarly, 77 percent of the American public and 39 percent of the elite think that foreign investors might pull their money out at any time. A total of 80 percent of the American public, compared to 55 percent of the elite, feels that foreign investors can cause a financial crisis by withdrawing their money from U.S. banks. According to 75 percent of the public and 55 percent of the elite, foreign investment in our economy will give foreigners more influence in our national government.

Are there any differences in attitude toward foreign investment by sector of the U.S. economy? Again, a significant gap exists between the general public and the elite: a majority of the American public feels that foreign investment made in every sector of the United States is bad, while a majority of the elite believe that foreign investment doesn't matter in every sector, except in U.S. newspapers and TV stations. Furthermore, concern over foreign investment by the general public is widely spread, encompassing every sector of the American economy, while the concern by the elite is concentrated on foreign investment in American newspapers, television stations, and natural resources.

Should Japanese investment in the United States be encouraged? Japan is singled out by 78 percent of Americans as the country doing most of the recent buying of U.S. real estate, banking, and manufacturing plants. (With only 18 percent citing it, Saudi Arabia is a distant second.) Concerning the Japanese investment in the United States, 63 percent of Americans feel it should be discouraged (according to a November 1988 Harris poll), while 10 percent feel it should be encouraged. (In Japan, a December 1988 Asahi Shimbun poll reported that 55 percent of the Japanese feel it should be discouraged; 19 percent feel it should be encouraged.) Even though Americans are critical of Japanese investment in the United States, in 1988, most Americans (73 percent) responding to a CBS News poll perceive U.S.-Japan relations as being friendly. In contrast, only 43 percent of the Japanese polled think relations are friendly.

Has foreign ownership of U.S. companies gone too far? Only 13 percent of the CEOs responding to a March 1989 Fortune 500/CNN Moneyline CEO poll feel that foreign ownership of U.S. companies has gone too far; 86 percent feel it has not.

Should the United States limit foreign investment? The March 1988 *Foreign Investment* revealed that, of the general public, 78 percent favor a law to limit the extent of foreign investment in American business and real estate. Only 13 percent of the elite agree.

Statistical Data

U.S. Investment Abroad

Department of Commerce figures show that since 1982 the U.S. net investment position has steadily declined, even though investment abroad has increased. The U.S. international investment position remained in surplus until 1985, when it dropped to an $111.4 billion deficit. Currently, the total net deficit amounts to $532.5 billion. Meanwhile, foreign investment in the United States has steadily increased. The U.S. investment deficit is projected to increase to $911 billion by 1991.

Between 1950 and 1987, U.S. *direct* investment abroad swelled from $11.8 billion to $308.8 billion, 70 percent of which occurred prior to 1980. Investments in the petroleum and manufacturing industries, in particular, dominate all other investments, but the relative shares of investments in these industries have changed markedly. The U.S. direct investment account remained in surplus until 1988, when it recorded $2 billion in deficit. In 1988 the U.S. direct investment abroad was approximately $327 billion in total, while foreign direct investment in the United States was approximately $329 billion, resulting in the trade deficit of $2 billion. In 1988, $152 billion of the $327 billion U.S. direct investment abroad was invested in Europe (primarily in the United Kingdom), challenging a common notion that American multinational companies are shifting their production facilities offshore to tap cheaper labor.

According to the Department of Commerce, trade between U.S. parent companies and their majority-owned foreign affiliates (MOFAs) in 1982 amounted to $148 billion in exports and $106 billion in imports, representing 70 percent of total U.S. exports and 44 percent of U.S. imports. From 1977 to 1986, the number of people employed by U.S. multinationals, either by parent companies or affiliates, fell by 2 million, from 26.1 million to 24.1 million.

Foreign Investments in the United States

The foreign capital inflows increased significantly in the 1980s. The Department of Commerce attributes these inflows mainly to the rise in real U.S. interest rates caused by the large U.S. federal budget deficits and the U.S. monetary policy. Foreign capital flows shifted from net capital outflows to net capital inflows, reaching $137 billion in inflows in 1988. This figure represents 3 percent of GNP or approximately 18 percent of the U.S. gross domestic investment (GPDI). Foreign holdings in the United States based upon 1987 figures account for close to 6 percent of U.S. wealth.

The foreign direct investment in the United States in 1988 increased by 21 percent ($57.1 billion) over the amount foreigners invested in 1987, reaching $328.9 billion. By industry, the largest share of foreign investments (37 percent in 1988) is in manufacturing industries. By country, the top five foreign direct investors are England ($101.9 billion), Japan ($53.4 billion), the Netherlands ($49 billion), Canada ($27.4 billion), and West

Germany ($23.8 billion). In 1988, Europe invested $216.4 billion directly in the United States.

The U.S. affiliate of foreign companies accounted for 12.1 percent of the total assets in the U.S. manufacturing sector in 1986, nearly double the comparable share in 1977. From 1977 to 1986, the foreign share of total assets increased in every sub-industry within the U.S. manufacturing sector.

Japanese Investment in the United States

Recently Japan has become a major player in international investments, particularly in the United States. Over the past five years, Japanese financial institutions have substantially increased their investments in government securities, while Japanese corporations have substantially increased their investments in manufacturing and retailing businesses. Figures from the Organization for Economic Cooperation and Development show that today Japan owns the biggest net assets abroad ($129.8 billion in 1985), surpassing West Germany in 1983, the United States in 1984, and England in 1985.

The Japanese once concentrated their investments in the wholesale trade sector in order to establish their distribution channels, but recently they have increased the portion of the funds they allocate to investments in the manufacturing sector. In 1988, for example, their investment in the manufacturing sector jumped by more than 200 percent to reach at least $12 billion. Furthermore, while the Japanese once concentrated their direct investments in raw materials in developing nations, recently they have increased their direct investments in developed countries. Also, they shifted their concentration from construction or acquisition of manufacturing facilities to government bonds, corporate stocks, and real estate.

The Japanese have substantially increased their direct investment in the United States over the years. Japanese direct investment outflows in the United States increased from $2.7 billion in 1982 to $18.2 billion in 1988.

Legislation

Restrictions on Industry and Foreign Investment

Restrictions applied by the United States on foreign direct investment or on foreign ownership of U.S. property are similar, though fewer in number, to those in other developed nations. The restrictions imposed by the federal government and the states are generally limited to areas of national security, like the maritime and aircraft industry, banking, resources, and nuclear energy. Other motives involve preventing foreign control of public services, like transport and communications.

Three major pieces of recently enacted legislation affecting foreign investment in the United States are the International Investment Survey Act of 1976, the Foreign Corrupt Practice Act of 1977, and the Agricultural Foreign Investment Disclosure Act of 1978. All are information-gathering and disclosure statutes, rather than actual restriction statutes.

The Exon-Florio Amendment to the Defense Production Act

The Exon-Florio Amendment was enacted as a part of the Omnibus Trade Competitiveness Act in 1988. Essentially, it gives the president the power to suspend or prohibit foreign mergers, acquisitions, and takeovers of U.S. firms when he feels it a threat to national security. Congress failed to define "national security" precisely, thus leaving the channel open for future presidents to regulate direct foreign investments at will. The current administration justified the passage of the Amendment as a means for protecting national security and not for raising obstacles for foreign investment. However, the danger still exists that future administrations might not be so reasonable. No matter what the initial cause, the fact is the Exon-Florio Amendment will serve as a damper against further foreign investment.

Bills Pending

Major pieces of legislation in the 101st Congress include:

H.R. 5 (Bryant)
Foreign Ownership Disclosure Act of 1989. Requires foreigners who hold a "significant" or a "controlling" interest in a U.S. business or property to register their holdings. This information would be compiled in a registry that would be available to designated groups or individuals and under procedures that would prevent the disclosure of information that identifies any specific individual or interest. Introduced January 3, 1989; referred to Committee on Energy and Commerce.

H.R. 231 (Jacobs)
Amends the Internal Revenue Code of 1986 to reinstate the tax on interest received by foreigners on certain portfolio debt investments and received from U.S. sources by foreign individuals and corporations. Introduced January 4, 1989; referred to Committee on Ways and Means.

H.R. 515 (Coyne et al.)
Amends the Internal Revenue Code of 1986 to create a special rule under which a foreign corporation will not be treated as a passive foreign investment company if it engages in substantial manufacturing or production activities in a foreign country that had a deficit in its trade balance with the United States for the preceding calendar year. Introduced January 19, 1989; referred to Committee on Ways and Means.

H.R. 1316 (Roth)
International Financial Security Act of 1989. Amends the Export Administration Act of 1979 to authorize the president to restrict the export or transfer of money or other financial assets to countries that are subject to national security export controls or that support terrorism. Also amends the Federal Deposit Insurance Act to prohibit the ownership or control of U.S. banks by countries subject to national security export controls. Introduced March 8, 1989; referred to various committees.

S. 266 (D'Amato)
Government Securities Fair Competition Act of 1989. Prohibits the Board of Governors of the Federal Reserve system and the Federal Reserve Bank of New York from designating any person of a foreign country as a primary dealer in governmental debt instruments if such country does not

accord to U.S. companies the same competitive opportunities in the underwriting and distribution of the instruments issued by such country as are accorded to domestic companies. Introduced January 25, 1989, referred to Committee on Banking, Housing, and Urban Affairs.

S. 856 (Murkowski)
Amends title 13 of the United States Code and the International Investment and Trade in Services Survey Act to improve the quality of data on foreign investment in the United States. Will specifically allow the bureaus of Economic Analysis and Census to share information they collect on foreign direct investments and allow access to BEA's information by certain policymaking bodies. Introduced April 19, 1989; referred to Committee on Commerce, Science, and Transportation.

A Case Study

Foreign Investments in the U.S. Steel Industry

Before joint ventures with foreign companies, the U.S. domestic steel industry incurred financial losses of about $11.6 billion. The industry also had a negative cash flow of over $3.3 billion.

Joint ventures with foreign companies existed prior to 1980; for example, Kyoei, Sumitomo purchased Auburn Steel in 1975. However, since 1980 foreign interests have played a large role as investors in the U.S. steel industry. Virtually every major domestic steel company has formed joint ventures of one sort or another with foreign steel companies. Since 1980, 19 joint ventures between foreign and domestic steel companies have been either started or announced. Foreign ownership shares range from approximately 20 percent to as much as 100 percent. Today, almost all major domestic steel companies in the United States (Armco, California Steel, Inland, LTV, National Steel) are in some sort of joint venture with foreign companies, especially the Japanese.

First, availability of low cost capital is critically important for the steel industry. The U.S. steel industry, facing relatively high cost of capital, has benefited from the capital offered at a low "reasonable" cost through foreign investment. Without foreign investment, some of the U.S. steel companies might not have survived. Secondly, foreign investment has facilitated the recent modernization of the U.S. steel industry. Modernization of the facilities has taken place in many of the projects with foreign ownership. Use of new technologies and processes has improved the quality of steel products and reduced the costs of production. In 1985, the National Academy of Engineering estimated that a new technique called "continuous casting" reduced the cost of finished steel products by approximately 10 percent. As a result of reduced costs, the domestic steel companies that have entered into joint ventures are now competitive in the domestic and even world steel markets as well.

Finally, although some observers are concerned that foreign ownership may transfer U.S. income to overseas, the U.S. steel industry has clearly benefited from the influx of foreign equity capital in recent years by boosting the U.S. steel industry and the U.S. economy.

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consulting research firm engaged in monitoring and evaluating trade legislation. Dr. Reynolds received a B.A. in Social Sciences and a M.A. in Psychology from International Christian University, Tokyo, and her Ph.D. in Social Psychology from the University of Michigan. She was an Assistant Professor at Wittenberg University, Ohio, and at Skidmore College, New York, before she founded Reynolds Research.

The Future of the Maquila Industry in Mexico

by Elsie Echeverri-Carroll

Introduction

Maquila is a Spanish word defined by the dictionary as "the portion of the corn paid to the miller for transforming the grain into ground corn." In the beginning of this century, Mexicans called the places where they took dough to be transformed into tortillas *maquilas*. Now maquilas, or maquiladoras, are plants assembling U.S. components that are reimported into the United States with taxes applied only to the value added in the foreign country. The common element between the original definition of the word and its modern application is the reference to a place where a *product is taken to be transformed and then returned to the original owner.*

Historical Changes in the Maquiladora Industry

In the 1960s and 1970s electronics and textiles were the two most important sectors in the maquila industry. Television sets and components made up the largest group of 806/807 imports from Mexico. The origins of the electronic maquilas can be traced to the 1960s when the U.S. television industry was heavily influenced by Japanese competition. Struggling to survive, U.S. firms moved many of their television assembly operations to Mexico, Taiwan, and later to Singapore. The textile industry was the second most important Mexican user of U.S. components for reimport in assembled products.

During the 1980s history repeated itself with the automobile industry. The Japanese responded to the appreciation of the yen against the dollar and to the increasing threat of renewed import restrictions by increasing the production of Japanese cars in the United States. Furthermore, the peso devaluations have made Mexico the country with the lowest wages among those--Hong Kong, Taiwan, Singapore, and Korea--where in-bond plants were traditionally located. U.S. companies responded to the competition from Japanese automakers locating in the United States by expanding their own assembly operations in Mexico. As a consequence, the maquila industry grew vigorously in the first half of the 1980s. The number of twin plants increased from 620 in 1980 to 1,400 in 1988.

Two sectors, the electronic/electric and the automobile, accounted for 66.9 percent of value added and 61.3 percent of employment of the maquila industry in 1988. These two sectors also accounted for 73.4 percent of the total components used in the industry and 38.7 percent of maquila plants in the same year. Although the electric/electronic sector still represents the largest group in the maquila industry, the dynamic growth of the automobile maquilas has been impressive. Employment in the auto-related maquilas has grown at an average annual rate of 891 percent between 1980 and 1988, increasing their participation in total employment in the industry from 6.2 percent to 20.1 percent during this period, while the electric/electronic-related maquilas decreased their participation from 63.8 percent to 41.2 percent.

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Increasing investments of Japanese automakers in the United States have stimulated the growth of Japanese maquila plants. The Japanese plants are producing and assembling components for Japanese and U.S. automobile and electric/electronic companies located in the United States. The majority of the Japanese plants are located in Tijuana (19 plants) and in Ciudad Juarez and neighboring cities (11 plants). The number of Japanese plants has grown from 39 in 1988 to 60 in August 1989, accounting for about 5 percent of total employment in the industry. Thirty-five Japanese plants are assembling electric and electronic components, 13 are assembling automobile parts, and 12 are producing and assembling a variety of items such as fruit concentrates, medical equipment, chicken packing, and porcelain figures. Yazaki American Corporation, with five plants producing wire harnesses for Ford and Japanese automakers located in the United States, is by far the most important Japanese investor in the maquiladora industry.

These economic changes have modified the location preferences of maquilas. Two geographical trends can be observed: first, maquilas show a slow but increasing preference for the interior of Mexico. For instance, although only about 10 percent of the total maquila industry is concentrated in the interior of Mexico, 24 percent of the new plants have located there. A second trend is the dynamic growth of maquilas in Mexican cities along the border with Texas. In the 1970s, the industry grew fast in Tijuana and neighboring cities because of the stronger participation of the electronic sector in the whole industry; however, in the 1980s the industry has grown significantly in cities like Ciudad Juarez and Reynosa, both located along the Texas-Mexico border. Texas has an obvious locational advantage: El Paso, which lies immediately across the border from Ciudad Juarez, is 1,674 miles from Detroit, while Tijuana is 2,308 miles away. Texas is also advantageously located in relation to the midwestern states, where most of the Japanese automakers are concentrated. In 1988, 45 percent of the maquilas were located in Mexican states along the border with Texas. Furthermore, these states accounted for 64.6 percent of total maquila employment in that year. Ciudad Juarez and Tijuana are the two major magnets for maquila operations, accounting for 16.6 and 26.3 percent, respectively, of total maquila plants, and 29.2 and 14.1 percent, respectively, of total maquila employment.

The Future of the Maquiladora Industry

Several elements play an important role in determining the future of the maquiladora industry: first, the economic growth of the U.S. economy, particularly of the electronic and automobile industries, the two most important sectors represented in the maquila industry; and second, the economic performance of Mexico, particularly its success in maintaining the stability of the country, keeping inflation down, and supplying the infrastructure needed in the communities along the border with the United States. Third, the slowdown or continuous growth of the Mexican maquilas will depend on the capacity of the country to sustain its competitive labor situation with respect to the Asian countries in which in-bond plants also operate.

Other factors will decide the future of the Japanese maquilas. A continuation of Japanese investment in the United States—particularly in the electronic and automobile

sectors—will play an important role in the success of these maquilas. Also critical will be the value of the yen against the dollar and the perception of the Japanese businessmen of the business climate in Mexico.

The U.S. Economic Outlook

The U.S. expansion is well into its seventh year. The severity of the next downturn remains unknown. Recent economic data suggest that the U.S. economy has moved into a period characterized by significantly slower growth. The critical question currently being debated by economists is whether or not this period of slower growth will lead to recession during the next 12 months. The near-term transition to substantially slower real domestic growth can be attributed largely to four factors. First, growth of exports has slowed down as a direct consequence of the more modest declines of the exchange value of the dollar witnessed during 1988, as well as the strength of the dollar seen during the first half of 1989. Second, strong exports during most of 1987 and 1988 stimulated substantial spending on new plants and equipment, but as the growth of export volume begins to subside, so too will expenditures on new plants and equipment. Thus, real business fixed investment will slow down during the 1989-90 period. Third, growth in consumer spending will remain relatively weak because consumers fear the possibility of unemployment. Fourth, slower sales rates will push manufacturers, wholesalers, and retailers to temper their additions to inventories; consequently, weaker inventory investment will serve as a drag upon real growth.

More and more attention is being paid to the possibility that the current slowdown in economic activity will degenerate into near-term recession. However, the WEFA Group's predictions suggest that there will be a soft landing. The weakness of the U.S. economy will diminish the pressure on wages and prices, forcing the Federal Reserve to refocus attention from keeping expansion on a noninflationary growth path toward controlling the possibility of recession. As a consequence, the Fed will ease credit conditions to stimulate investment and consumer expenditure in big-ticket items, mitigating the decline in domestic demand that can result in recession. It is unlikely that the growth of consumer expenditure will deteriorate further in the near term. In fact, a moderate pickup in consumer spending is likely. In sum, barring any exogenous shocks (oil price hikes, nuclear war, political chaos in Washington), the U.S. economy is likely to be headed toward a period of substantially slower growth, not into recession. In other words, lower interest rates allowed by slower growth of domestic demand and easing of industrial inflation will set the stage for renewed strength during the second half of 1990.

The forecast for the U.S. automobile industry suggests continuous market weakness, accumulation of large inventories, and large production cuts. The effectiveness of domestic manufacturers' incentive programs has eroded as a result of the commitment by import competitors to the incentive game, and slowing in the economy will result in increased consumer buying cautiousness, particularly about big ticket items like autos.

Contrary to this scenario, sales of Japanese automobiles produced in the United States will continue to grow. Since Honda became the first Japanese company to build cars in the United States in 1982,

its example has been followed by Nissan, Mazda, and Toyota. Honda and Toyota have recently announced aggressive plans for expansion of U.S. operations. Honda plans to increase its U.S. car sales by 10 percent from about 7.65 percent and their worldwide sales by 30 percent, all by the mid-1990s. Toyota expects to more than double its North American car- and truck-building capacity by 1995. Because U.S. plants represent about 80 percent of the total in-bond plants assembling automobile parts in Mexico, we can expect slower growth of automobile-related maquilas as U.S. automakers confront weak sales.

The mix of sectors within the broader definition of electronics makes it difficult to predict what will happen in the U.S. electronic industry. The WEFA Group expects that in spite of a slight slowdown in growth of the general economy in late 1989 through early 1991, electronics will be only marginally affected. The net effect will be positive growth rates only slightly lower than they would be otherwise.

The Mexican Economy

The economic outlook for Mexico is optimistic. The government extended the Solidarity Pact through the end of March 1990. This new extension of the pact continued the one-peso-per-day depreciation of the exchange rate and the freeze on most controlled prices. Wage control continues, although a 6 percent revision was allowed in July 1989. Agreement on the external debt reduction and a near guarantee of a bridge loan have given credibility to the pact's extension and have boosted expectations about the economic performance in the medium term. Foreign investment is expected to play a key role during this administration, increasing almost twofold from $2.72 billion in 1989 to $5.4 billion in 1994.

Labor costs in dollar terms in Mexico are expected to rise if inflation and minimum wages increase and if the peso rises against the dollar. The prediction is that there will be moderate average annual inflation of 19.8 percent at the end of 1989 and 15.3 percent at the end of 1990. These are significantly lower rates than the 131.8 percent in 1987 and the 114.2 percent in 1988, although still higher than the targeted rate of 5 percent (similar to the United States). A continuing devaluation of the peso is likely, but at a much slower rate. The devaluation rate was 148.55 percent and 138.2 percent during 1986 and 1987; it will continue to average 16 percent at the end of 1989 and 13 percent for 1990. No further increases in minimum wages are expected for 1989, and a modest increase is expected in 1990. All these changes will mean that salaries will be somewhat higher than they have been, the devaluation not having fully compensated for increases in the minimum wage and inflation. Higher wages in dollar terms and the slower growth of the U.S. economy, particularly in the automobile and electronic industries, suggest stable growth for the maquiladora industry in the year ahead. However, if the already serious shortcomings of infrastructure worsen, this will contribute to slow maquila growth if there is no comparative advantage to locating in the interior of the country.

Finally, the last element in the analysis is the competitive situation of Mexico in relation to other countries with in-bond plants. These comparative advantages are cost and productivity of the labor force. Mexico continues to be the least expensive place to produce when compared to Taiwan, Korea, and Singapore. However,

new competitors such as the Philippines, China, and Malaysia have lower labor costs than Mexico. Nevertheless, proximity to the United States remains a strong factor in favor of Mexico.

The maquila industry's deceleration results from a slowdown of the U.S. economy during 1989-90 and from a weakening of the U.S. industrial sector. The deceleration is also a lagged effect of the significant increases in Mexican costs recorded during 1988 and the beginning of 1989. This trend will continue despite continued support to this sector by the present Mexican administration and despite the persistence of the wage differential between Mexico and other countries.

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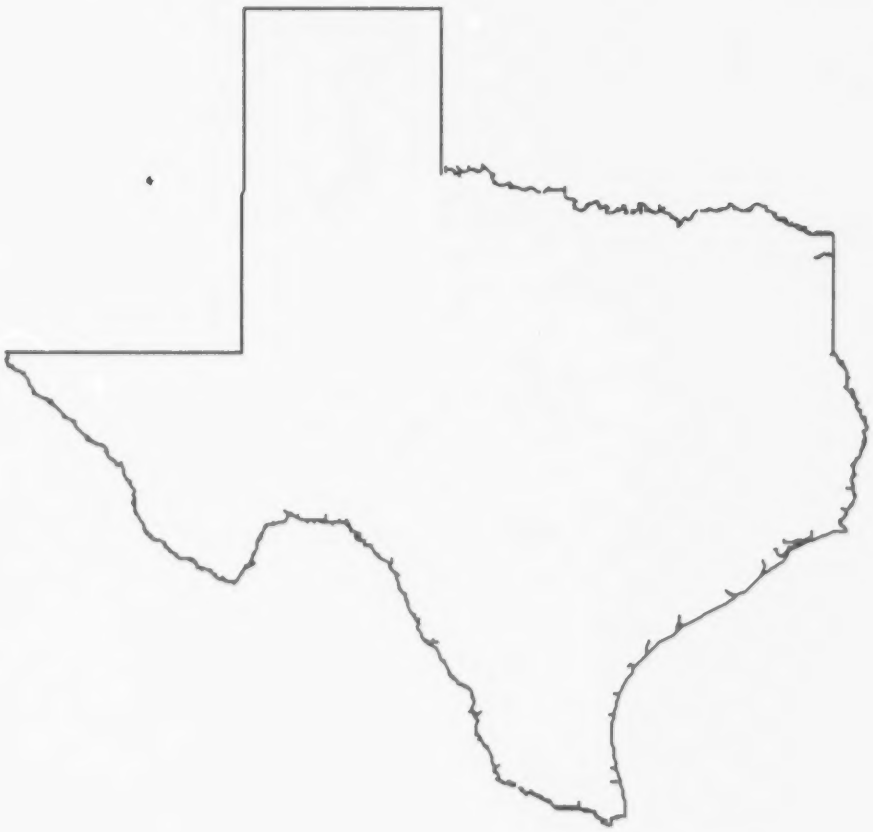

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